Fig. 1. County Chairmen of Institutes.

Commonwealth of Pennsylvania.

DEPARTMENT OF AGRICULTURE

BULLETIN No. 197

PROCEEDINGS OF THE

FARMERS'

Annual Normal Institute

AND SPRING MEETING

State Board of Agriculture

COMPILED BY

A. L. MARTIN, DIRECTOR OF INSTITUTES

HELD IN THE COURT HOUSE, BUTLER, PA.

MAY 24 TO 27, 1910

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA.
1910

1.3
STE 197-210

SUMMARY OF CONTENTS.

	Page.
Preface,	5
Letter of Transmittal,	7
Members State Board of Agriculture,	9
Proceedings Spring Meeting, Board of Agriculture,	13
List County Chairman, Farmers' Institutes,	36
List State Lecturers, Farmers' Institutes,	38
Program Farmers' Annual Normal Institute,	40
Proceedings Farmers' Annual Normal Institute,	46
Address of Welcome, Judge James M. Galbraith,	47
Response to Address of Welcome, L. W. Lighty,	50
Response to Address of Welcome, R. P. Kester,	53
Letter Governor Stuart,	54
Letters Jason Sexton, Sara Phillips Thomas and W. H. Stout,	55
The Farmer a Manufacturer, Prof. Franklin Menges,	58
Starting an Orchard, Prof. W. J. Green,	74
Spraying, the Sheet-anchor of Success, Dr. J. H. Funk,	85
Fertilization and Cultural Methods for Apple Orchards, Prof. John T. Stewart,	94
Profitable Breeding and Feeding of Beef Cattle, O. E. Bradfute,	114
Beef Cattle—their Relation to Pennsylvania Agriculture, Prof. W. A. Cochel,	126
Address, E. S. Bayard,	129
Practical Methods of Potato Growing, E. A. Rogers,	135
Some Modern Poultry Problems, J. T. Campbell,	147
Some Reasons for Poor Hatches, W. Theo. Wittman,	153
The Farmer and his Recreation, Enos H. Hess,	157
Educational Utility, Dr. Edwin Earle Sparks,	158
South American Agriculture, Prof. E. M. Baxter,	166
The Cost of Market Milk, Edward Van Alstyne,	179
The Protein Requirements of the Dairy Cow, Prof. Wells W. Cooke,	191
Cow Testing Associations, Helmer Rabild,	197
Report of Committee on Resolutions,	202
The Requisites of a Good Institute Lecturer, Edwin Van Alstyne,	205
What Constitutes a Good County Chairman of Institutes, H. G. McGowan,	214
Mothers as Chums, Miss Arabella Carter,	227
Domestic Science and the High Cost of Living, Miss Sara C. Lovejoy,	233
Women's Share in Agriculture, Miss Martha VanRensselaer,	239
Some Things Outside the Farmyard Gate, Fred W. Card,	243
How to Raise Crops Without Weeds, Dr. J. D. Detrich,	250

136367

PENNSYLVANIA
STATE LIBRARY

PREFACE.

Commonwealth of Pennsylvania,
Department of Agriculture,
Harrisburg, Pa., July 20, 1910.

There is perhaps no source of information upon subjects relating to either practical or scientific agriculture that is so easily available as the Farmers' Institute, and whatever adds to the efficiency of these institutes is of paramount importance. The hope of increasing their usefulness to the farmers of the State has led to the establishment of what is known as the Farmers' Normal Institute, in which all institute managers and lecturers of the State come together once a year for consultation and instruction.

In order that the instruction given at these institutes may be available to the greatest possible number, this Department publishes in bulletin form their proceedings, and so we send out the following bulletin, No. 197, containing the full proceedings of the Normal Institute held at Butler, Pa., May 24-27, 1910, in the hope that it may prove helpful upon the many farms and in the many farmhouses to which it may come.

N. B. CRITCHFIELD,
Secretary of Agriculture.

LETTER OF TRANSMITTAL.

Commonwealth of Pennsylvania,
Department of Agriculture,
Harrisburg, Pa., July 18, 1910.

Hon. N. B. Critchfield, Secretary of Agriculture:

Dear Sir: I have the honor to present herewith, bulletin of the Ninth Annual "Farmers' Normal Institute," which was held at Butler, Pa., May 24 to 27, 1910.

Very respectfully,

A. L. MARTIN,
Director of Institutes.

MEMBERS

OF THE

PENNSYLVANIA STATE BOARD OF AGRICULTURE,

FOR THE YEAR 1910.

MEMBERS EX-OFFICIO.

HON. EDWIN S. STUART, Governor.
HON. HENRY HOUCK, Secretary of Internal Affairs.
DR. N. C. SCHAEFFER, Superintendent of Public Instruction.
DR. EDWIN EARLE SPARKS, President of the State College.
HON. A. E. SISSON, Auditor General.
HON. N. B. CRITCHFIELD, Secretary of Agriculture.

APPOINTED BY THE GOVERNOR.

R. I. Young, Middletown, Dauphin County, ...Term expires 1911
R. H. Thomas, Jr., Mechanicsburg, Cumberland County, ...Term expires 1912
Gen. James A. Beaver, Bellefonte, Centre County, ...Term expires 1913

APPOINTED BY THE STATE POULTRY ASSOCIATION.

J. D. Nevius, ...Philadelphia, ...1910

APPOINTED BY THE PENNSYLVANIA BRANCH OF THE AMERICAN POULTRY ASSOCIATION.

W. Theo. Wittman, ...Allentown, ...1913

ELECTED BY COUNTY AGRICULTURAL SOCIETIES.

			Term expires.
Adams,	A. I. Weidner,	Arendtsville,	1912
Allegheny,	A. J. Purdy,	Imperial, R. F. D. No. 1,	1912
Armstrong,	S. S. Blyholder,	Kelly Station.	1911
Beaver,	A. L. McKibben,	New Sheffield,	1911
Bedford,	David W. Lee,	Bedford,	1912
Berks,	H. G. McGowan,	Geiger's Mills,	1913
Blair,	Howard Cox,	Bellwood,	1911
Bradford,	F. D. Kerrick,	Towanda,	1913
Bucks,			
Butler,	N. F. Bartley,	Euclid,	1911
Cambria,	Jas. Westrick,	Patton, R. F. D. No. 2,	1913
Cameron,			
Carbon,			
Centre,	John A. Woodward,	Howard,	1912
Chester,	M. E. Conard,	Westgrove,	1912
Clarion,	J. H. Wilson,	Clarion,	1913
Clearfield,	Peter Gearnart,	Clearfield,	1913
Clinton,	J. A. Herr,	Millhall, R. F. D.,	1911
Columbia,	A. P. Young,	Millville,	1912
Crawford,	J. F. Seavy,	Saegerstown,	1911

			Term expires.
Cumberland,			
Dauphin,			
Delaware,	E. J. Durnall,	Swarthmore,	1911
Elk,	John M. Witman,	St. Mary's,	1911
Erie,			
Fayette,			
Forest,			
Franklin,	John P. Young,	Marion,	1911
Fulton,	J. L. Patterson	McConnellsburg,	1913
Greene,	N. M. Biddle,	Carmichaels,	1913
Huntingdon,	Geo. G. Hutchison,	Warrior's Mark,	1912
Indiana,	S. C. George,	West Lebanon,	1913
Jefferson,	Peter B. Cowan,	Brookville,	1913
Juniata,	Matthew Rodgers,	Mexico,	1912
Lackawanna,	Horace Seamans,	Factoryville,	1913
Lancaster,			
Lawrence,	Sylvester Shaffer,	New Castle,	1913
Lebanon,	H. C. Snavely,	Cleona,	1913
Lehigh,	P. S. Fenstermaker,	Allentown,	1913
Luzerne,			
Lycoming,	A. J. Kahler,.	Hughesville,	1912
McKean,	O. W. Abbey,	Turtle Point,	1913
Mercer,	W. C. Black,	Mercer,	1911
Mifflin,	M. M. Naginey,	Milroy,	1913
Monroe,	F. S. Brong,	Saylorsburg,	1913
Montgomery,	J. Sexton,	North Wales,	1911
Montour,	J. Miles Derr,	Milton, R. F. D.,	1911
Northampton,	C. S. Messinger,	Tatamy,	1912
Northumberland,	I. A. Eschbach,	Milton, R. F. D.,	1911
Perry,	A. T. Holman,	Millerstown,	1913
Philadelphia,	David Rust,	Philadelphia,	1913
Pike,			
Potter,			
Schuylkill,	John Shoener,	New Ringgold,	1913
Snyder,			
Somerset,	John C. Weller,	Rockwood,	1911
Sullivan,	E. R. Warburton,	Campbellsville,	1912
Susquehanna,	Frank A. Davies,	Montrose,	1913
Tioga,	E. B. Dorsett,	Mansfield,	1911
Union,	J. Newton Glover,	Vicksburg,	1911
Venango,			
Warren,	R. J. Weld,	Sugargrove,	1911
Washington,	D. S. Taylor,	Burgettstown,	1911
Wayne,	Warren E. Perham,	Pleasant Mount,	1911
Westmoreland,	M. P. Shoemaker,	Greensburg,	1913
Wyoming,	D. A. Knuppenburg,	Lake Carey,	1913
York,	G. F. Barnes,	Rossville,	1911

OFFICERS.

PRESIDENT.

Hon. Edwin S. Stuart, Governor, ... Harrisburg.

VICE PRESIDENTS.

John C. Weller, ... Rockwood.
H. C. Snavely, ... Cleona.
S. S. Blyholder, ... Kelly Station.

EXECUTIVE COMMITTEE.

P. S. Fenstermaker, Chairman, ... Allentown.
Matthew Rodgers, ... Mexico.
A. J. Kahler, ... Hughesville.
D. A. Knuppenburg, ... Lake Carey.
A. T. Holman, ... Millerstown.
J. Newton Glover, ... Vicksburg.
M. P. Shoemaker, ... Greensburg.
H. G. McGowan, ... Geiger's Mills.
N. B. Critchfield, Secretary, ... Harrisburg.

ADVISORY COMMITTEE.

N. B. Critchfield, Secretary, ... Harrisburg.
A. J. Kahler, ... Hughesville.
H. G. McGowan, ... Geiger's Mills.
F. D. Kerrick, ... Towanda.

CONSULTING SPECIALISTS.

Botanist,, ...	Prof. W. A. Buckhout, ...	State College.
Pomologist, ...	Gabriel Hiester, ...	Harrisburg.
Chemist, ...	Dr. William Frear, ...	State College.
Vet. Surgeon, ...	Dr. S. H. Gilliland, ...	Harrisburg.
Sanitarian, ...	W. H. Banks, ...	Mifflintown.
Microscopist and Hygienist, .	Prof. J. W. Kellogg, ...	Harrisburg.
Entomologist, ...	Prof. Franklin Menges, ...	York.
Ornithologist, ...	Prof. H. A. Surface, ...	Harrisburg.
Meteorologist, ...	E. R. Demain, ...	Harrisburg.
Mineralogist, ...	Baird Halberstadt, ...	Pottsville.
Apiarist, ...	H. C. Klinger, ...	Liverpool.
Economic Geologist, ...	Dr. Isaac A. Harvey, ...	Lock Haven.
Agricultural Geologist, ...	W. H. Stout, ...	Pinegrove.
Forests and Forestry, ...	Robert Conklin, ...	Harrisburg.
Feeding Stuffs, ...	G. G. Hutchison, ...	Warrior's Mark.

STANDING COMMITTEES.

LEGISLATION.

Hon. H. G. McGowan, Chairman, ... Geiger's Mills.
Hon. A. J. Kahler, ... Hughesville.
Matthew Rodgers, ... Mexico.
S. S. Blyholder, ... Kelly Station.
E. B. Dorsett, ... Mansfield.

CEREALS AND CEREAL CROPS.

J. Miles Derr, Chairman, ...

ROADS AND ROAD LAWS.

H. C. Snavely, Chairman, ... Cleona.

FRUIT AND FRUIT CULTURE.

D. A. Knuppenburg, Chairman, ... Lake Carey.

DAIRY AND DAIRY PRODUCTS.

Dr. M. E. Conard, Chairman, ... Westgrove.

FERTILIZERS.

A. T. Holman, Chairman, ... Millerstown.

WOOL AND TEXTILE FABRICS.

D. S. Taylor, Chairman, ... Burgettstown.

LIVESTOCK.

J. L. Patterson, Chairman,..... McConnellsburg.

POULTRY.

W. Theo. Wittman, Chairman, ... Allentown.

PROCEEDINGS OF THE SPRING MEETING OF THE PENNSYLVANIA STATE BOARD OF AGRICULTURE, HELD IN THE COURT HOUSE, BUTLER, PA., MAY 24, 1910.

Tuesday, May 24, 1910, 9.30 A. M.

Vice President John C. Weller, in the Chair.

The CHAIRMAN: The first in the order of business is the calling of the roll of the members. The Secretary will please call the roll.

Secretary Critchfield called the roll, in answer to which the following gentlemen answered to their names:

S. S. Blyholder, Armstrong county; H. G. McGowan, Berks; N. F. Bartley, Butler; Peter Gearhart, Clearfield; J. A. Herr, Clinton; J. F. Seavy, Crawford; J. L. Patterson, Fulton; Peter B. Cowan, Jefferson; Horace Seamans, Lackawanna; W. C. Black, Mercer; C. S. Messinger, Northampton; John Shoener, Schuylkill; John C. Weller, Somerset; M. P. Shoemaker, Westmoreland; G. F. Barnes, York; W. Theo. Wittman, appointed by the Pennsylvania Branch of the American Poultry Association; Hon. N. B. Critchfield, Secretary of Agriculture, ex-officio member.

The following members came in later: A. I. Weidner, Adams; F. D. Kerrick, Bradford; M. E. Conard, Chester; A. P. Young, Columbia; S. C. George, Indiana; M. M. Naginey, Mifflin; F. S. Brong, Monroe.

A quorum being present at the first roll-call, the meeting was open for business.

The CHAIRMAN: The next item on the program is the reading of the minutes of the last meeting. The Secretary will please read the minutes.

The Secretary began to read the minutes of the last meeting.

MR. BLYHOLDER: Not to interfere with the Secretary, but inasmuch as these minutes are all published, and it certainly will be a relief to the Secretary, I move the further reading of the minutes be dispensed with.

The motion was seconded, put and carried.

The SECRETARY: I am certainly very much obliged.

The CHAIRMAN: The next item is the appointment of the Committee on Credentials. I will name as that committee, Messrs. Herr, Messinger, Patterson, Gearhart and Cowan.

Are there any credentials to be handed to the Committee? Does the Secretary have any credentials?

The SECRETARY: Mr. Chairman, by some arrangement, for which the Secretary of Agriculture is not responsible, the time-tables do not tell the truth. I consulted a time-table that told me that a certain train left Pittsburg at 6.42 this morning and arrived at Butler at 8.30, I believe, or 8.15; and when I got up to the Pennsylvania Depot I found that some party belonging to the Ananias Club had prepared that schedule and I could not come at that time; and then you ought to have seen the hustling that was done. The first effort that was made was to reach here by the trolley, and when I found that the trolley was too late, the next effort that was made was to cross to Allegheny City, to the B. & O. R. R., and we got started. We were on an express train, but the B. & O. kept up its record and we reached here behind time. When we got to the hotel I rushed to the Court House, for I have made it a point all my life not to be late, and I left the credentials in my satchel. I know I have the credentials of some two or three persons elected to membership since our last meeting and if Brother Herr or Brother Blyholder will entertain the audience by making a good speech while I am gone I will be glad to go over and get the credentials. That is the best I can do under the circumstances.

MR. HERR: That is what we have the Chairman for.

The CHAIRMAN: The Chairman is to preside.

The SECRETARY: The business of the Chairman is to see that those who make the speeches do it in an orderly manner.

MR. HERR: If there are any credentials, in the meantime they may be passed in.

The CHAIRMAN: Any members having credentials will pass them to the Committee.

Does our Secretary have anything for the Board, or the Director of Institutes, Mr. Martin, in the meantime?

MR. HERR: I think you better not call a meeting of the Committee until the Secretary returns with the other credentials.

The CHAIRMAN: We will have a speech from Mr. Herr while we are waiting.

MR. HERR: This don't happen to be my turn. It ought to commence with Adams county or Allegheny. I don't like to make any impromtu speeches because I am not loaded, and I am afraid I could not entertain you or do any credit to myself. I am interested, however, in the meetings of the State Board of Agriculture. I can look

back for a good many years and see what they have done and what kind of material they are made of, and the difficulties we had to maintain the Board in the days of its tribulations, until now we have pretty fair sailing. We have been supplanted or succeeded in a great deal of our work by the Department of Agriculture. We have started a new branch, the principle of which is taking charge of the Farmers' Institutes; and there is also another important duty connected with it, and that is to be as far ahead as possible of the agriculture interests of the county in which we reside. Now, the parties who think we have nothing to do except come to the meetings and back again, are not entirely correct. There is hardly a week in the year that we do not have application for some information along agricultural lines, and we are obliged to do a good deal of gratuitous work during the course of a year in the matter of giving information to the public generally a sort of supervising or superintending the agricultural interests of the county as the different occasions may arise. Of course, we do this cheerfully because we are interested in agriculture. I am glad to say that the Board of Agriculture is made up almost entirely of practical farmers interested in and along all lines of agriculture. We ought to extend our influence further, not only taking care of agricultural interests, but look out and see that they are extended throughout the State. We ought to be treated according to our importance in the industries of the State. There is no industry that ours is second to. There are more farmer voters in the State than any one other occupation and I think it is fair to say that three-fifths of the voters in Pennsylvania are either farmers, farm employes or interested in farming in some way or another. I just simply want to suggest that we look up the importance of our interests in the matter of legislation and in the matter of conducting the affairs of our State and government.

The Secretary has arrived and you will excuse me from making any further remarks; but this is a subject that would bear a great deal of investigation. In our own county, I never yet saw a Republican farmer elected as a member of the Assembly from Clinton county, and only one Democrat farmer in all my career, and yet the majority of voters are farmers. We neglect to bring them forward as we ought to do and could do if we would.

The CHAIRMAN: We now have the credentials and will pass them over to the Chairman of the Committee on Credentials.

The next item of business calls for the Report of the Committee on Credentials, but I suppose the members are not ready to report at this time. The next item on the program is Unfinished Business.

The SECRETARY: There is no unfinished business.

The CHAIRMAN: The Committee on Credentials will please retire with the Chairman of that Committee.

There being no unfinished business, the next is New Business. Is there any new business to come before the Board?

The SECRETARY: Mr. Chairman, I have no knowledge of any new business to come before the Board. If there should be any, the

Executive Committee will no doubt be able to inform us. Are there any members of the Executive Committee present at this time?

Messrs. Shoemaker and McGowan were the only members of the Committee present in addition to Secretary Critchfield.

The CHAIRMAN: Have any members of the Committee anything to suggest?

MR. SHOEMAKER: Nothing, that I know of.

The SECRETARY: The Executive Committee has had no meeting since the last Board meeting.

The CHAIRMAN: The next on the program is Miscellaneous Business. Is there any miscellaneous business to be transacted? There appears to be none. What is the pleasure of the Board? Will we take a recess until the Committee on Credentials is ready to report, or have you anything to bring before the meeting?

The SECRETARY: I would suggest that while the Committee are out preparing their report that the members of the Board will make a statement, in a few words or as many as they want to employ, of the condition in their respective counties and sections from which they come. At Harrisburg we have heard a great deal about the ravages of frost and the damage that has been done, and there seems to be some disagreement. According to the stories that we hear from one quarter we would think that almost everything was killed, that there was very little for us to live upon; and then, according to the stories we hear from others, again, there seems to be a fairly good amount of fruit left, and I have not heard any complaint of the wheat being injured. Yesterday, however, I was traveling and looking out of the car window and I saw several fields of wheat that I thought have been injured by the freezing. If the wheat has formed its first joint before a hard freeze, it has a pretty hard time of it. But while I had no opportunity to examine, I think perhaps a few fields were injured. I would like to know the conditions throughout the State. How is it in your section of Lackawanna county, Mr. Seamans?

MR. SEAMANS: We had several frosts this month. The thermometer at one time went to six degrees below freezing point. I think that some of the early fruit is badly damaged in my immediate vicinity. The wheat is something that we raise in Lackawanna county only in a small way. The wheat is not rusted much. We raise some wheat on our own farm for soiling purposes and to feed our cows. I don't think that was injured, although on low land. But I do think that the fruit, especially plums and cherries, are quite considerably injured. Now, we have with us to-day, from our county, Mr. Northup, and he lives on high land and I would like to hear from him, with your permission.

The CHAIRMAN: There is no objection. We will hear from Mr. Northup.

MR. NORTHUP: Mr. Chairman, our farm is on the hill. We have fine prospects of plums, looking fine with a good set on the trees; never had as fine plums as this Spring. And peaches,—we don't always get a crop of peaches in Lackawanna county, but this year we have good prospects. We have peaches on the trees—I don't want Dr. Funk to hear me—but we have peaches the size of the little finger, and this is remarkable for us, and they are stuck all over the trees. We are going to have peaches and apples. The orchards are loaded fine. Of course, we don't expect every blossom to furnish us an apple. We have never expected that, but we have plenty on the trees and more than that we have a grand good market within ten miles of the farm where we have a place to put them all.

The SECRETARY: This is certainly encouraging and I am glad to hear such conditions. Can you tell us how it is in the low lands?

MR. NORTHUP: We have on the hill regions quite a quantity of cherries. Now, these are as large as peas and looking fine, and there don't seem to be any shortage of cherries on the hill; but my field extends in the valley and there it is always frosty and I noticed one of the wild cherry trees in the Spring was full of blossoms, and I went along the other day and I could not find a cherry. Some drop badly so I think the whole must have suffered.

The CHAIRMAN: Warren county, Mr. Woodside, what can you say?

MR. WOODSIDE: I think there is injury to some extent in Warren county but not very badly. We are in the northwestern part of the State and crops and fruits are not advanced as far as in the southern part and did not get out so far. We had several severe frosts. I don't think wheat was injured to any extent. We raise some there. I don't think the grass was. In fact, I don't think the frost injured Warren county very much.

The CHAIRMAN: Armstrong county.

MR. BLYHOLDER: We had apparently some very hard freezing, but from examinations after these frosts, we feel satisfied, taking our place as a whole, low and high lands, that at the present day the prospects are for an abundant crop of fruit of nearly all kinds. There are some tender varieties of cherries that are damaged to some extent; early strawberries in some localities damaged a little. But taking it upon the whole, we expect to have an abundant crop of fruit from present indications, and I notice the only thing that I think is hurt to any extent, that will injure the crop, is timothy hay. I notice in some places that it is frozen so that it will hurt the crop considerably.

The CHAIRMAN: Mr. Seavy, can you tell us the conditions in Crawford county?

MR. SEAVY: We had, Mr. Chairman, a good many frosts the fore part of May. Quite a number of mornings ice was frozen over the ditches of water and pails set out, and the early plums are killed in my part of the county at least. The strawberry patches in the low-lands, I am told by the owners, the crop is ruined but the high ground patches are all right yet. The later fruit is very slow in blossoming, they stay on a long time and a good deal of it will be all right. The cherries, pears and apples will be a fair crop I would think. But our grass has suffered. A number of mornings the clover was frozen until it dropped over and some of it turned light colored. The prospects of our meadows are rather poor at this time. Our wheat is looking very good and has not been hurt by the frost.

The SECRETARY: Have you noticed whether your spring seeding of clover has been injured?

MR. SEAVY: I have not. It looks—what I have looked at and asked my neighbors some about—that it is all right. Our people seed a good deal on oats ground or that was sown to oats last March or until the middle of April and it is looking quite good. And the wheat sets I think are not hurt on account of being protected by the grass; but the older meadows are not looking as well as they did a month ago in proportion to time, and I hear a good many of my neighbors talking that the hay crop will be light.

The SECRETARY: Are your farmers doing anything that will supply the shortage in the hay crop?

MR. SEAVY: They are planting sweet corn and ensilage.

The SECRETARY: Sow any millet?

MR. SEAVY: We raise very little millet in Crawford county. Our people usually, when there is a shortage, turn to corn, sweet corn and ensilage to make up the deficiency.

The CHAIRMAN: Let us hear from York county.

MR. BARNES: The frosts that we had in our county I don't think injured anything as severely as the strawberry crop. I believe from the information I received from the larger growers, that at least one-half or probably two-thirds of the crop is damaged, possibly ruined. The wheat and grass through our section are as good as I ever saw. I have clover on my place over two feet high. I have Mr. Lighty by my side here, who is quite an extensive fruit grower and grows a number of strawberries, and I would like him to speak to you.

MR. LIGHTY: Mr. Chairman, I have been in our section of the State and heard that we suffered because our early potatoes and the

garden truck, peas, etc., were frozen down to the ground and we felt a little blue; but after a few days the showers came and things recovered and about the only thing that will be short is the strawberries, and yet we will have plenty to eat for ourselves and plenty for all the good people who come to visit us, if not to make money. Our hay crop will be a little short, but we are planting more corn and we have plenty of feed so I think we will have plenty to eat and have some to spare for the people in the towns, if they don't call too loudly about the cost of living.

The CHAIRMAN: Mifflin county.

MR. NAGINEY: We have had extensive frosts in our county in some localities and I think the wheat was badly damaged. We have a fruit grower living adjoining me and he complains a good deal, especially about the stone fruit, the plums and cherries and also strawberries. I find the last few days the pears are dropping quite a good deal. My trees were sprayed a short time and were full, but are dropping off now. Some were frozen at the stem and so I attribute that to the frost. Some of the pears were as large as the end of my finger. The apple will be an elegant crop, certain varieties, in the mountainous sections of Central Pennsylvania. The hay crop, clover hay, never was finer than in our section. The wheat is fine. The timothy hay is hurt. Something has turned it yellow. I don't know if it was the frost. It looks as if we will not have a famine, at any rate, but something to spare for the people around us.

MR. HERR: The Committee on Credentials is ready to report.

The CHAIRMAN: We will now have the Report of the Committee on Credentials, Mr. Herr, Chairman:

REPORT OF COMMITTEE ON CREDENTIALS.

MR. HERR: Your Committee on Credentials begs leave to submit the following report:

We have examined the credentials of the following persons:

Clarion county, Hon. J. H. Wilson, Clarion, Pa.
Philadelphia county, David Rust, Horticultural Hall, Broad street below Locust, Philadelphia, Pa.
Indiana county, S. C. George, West Lebanon, Pa.
Monroe county, F. S. Brong, Saylorsburg, Pa.

Each of these persons is sent for three years from January, 1910.

We find the credentials are in proper form and would recommend the election of these persons to membership in the State Board of Agriculture.

(Signed.)

J. A. HERR,
J. L. PATTERSON,
C. S. MESSINGER,
PETER B. COWAN,
PETER GEARHART,

Committee on Credentials.

The CHAIRMAN: You have heard the Report of the Committee on Credentials. What is the pleasure of the Board in reference thereto?

MR. BLYHOLDER: I move the Report be received, the recommendations adopted and the members seated.

MR. McGOWAN: I second the motion.

The SECRETARY: I would like to ask the Committee whether they have made any inquiry as to the standing of the organizations that send these credentials. I have been informed that sometimes there are credentials that come in proper form from organizations or societies that are not in existence. I would like to know whether that is true.

MR. HERR: We have no power of going behind the credentials. The credentials are here with the seal of the organization stamped on and we have no means of going back of them, on the properly prepared blank; so that I do not know what we can do beyond that.

The SECRETARY: The Committee might at least call the parties in if they are here and make some inquiry as to that matter.

MR. HERR: That is so, but it would be a very unusual thing to do that. We never do that unless there is some evidence of the thing before us.

The CHAIRMAN: Are there any other remarks? Are you ready for the question?

MR. BLYHOLDER: I would like to ask the Chairman of the Committee, whether these credentials are signed or stamped with the seal of the county organization or just some fair association.

The CHAIRMAN: Can the Chairman of the Committee answer that.

MR. HERR: Clarion county is stamped with the Clarion County Fair Association seal. That is the same organization that has sent the member previous to this year. David Rust's is signed by the

Pennsylvania Horticultural Association, of Philadelphia; stamped with the seal of that organization. That is the same organization that the Professor from Philadelphia represented. I forget his name. He is a florist.

The SECRETARY: That is all right, if the same organization.

MR. HERR: S. C. George, Indiana, Indiana County Agricultural Society; the seal calls for it. That is the name of it.

F. S. Brong, Monroe, Monroe County Agricultural Society; the seal is here. That is what it claims to be.
I think they are all correct as far as I am able to judge.

The CHAIRMAN: Any other questions or remarks?

The motion was then put and carried and the Chairman announced that the persons named were accepted as members of the State Board.

The CHAIRMAN: Shall we continue the other work now?

The SECRETARY: This is a matter of very great interest, I know, to Brother Martin and myself. If you had to answer questions as often as we do about the condition of affairs in the State, you would know why we are glad to listen to these reports. How is it with you, Mr. Martin, are you not anxious to hear the reports?

MR. MARTIN: I second the remarks of the Secretary.

The SECRETARY: I want to hear from the county represented by the Chairman. I have not been at my farm. I have not had favorable reports as far as fruit there is concerned. I did hear from a gentleman, whose home is not far from the Chairman's, who said that the whole business is gone; that they had ice down there a quarter of an inch thick. I am almost surprised that the Chairman got here.

The CHAIRMAN (John C. Weller, Somerset county): We had the ice. I am sure of that, and ice in some parts of the county not far from my home, even in Turkey Foot. I can speak for the southern part of the county. Some fruit was frozen. We had severe frosts in Somerset and the wheat did look as if it was injured. It seemed dark and discolored, but what the effect will be I am not able to say at this time. It may develop later, but we certainly had very severe frosts.

The SECRETARY: Whether or not will there be any apples?

The CHAIRMAN: There will be some, but not many at my home; but in certain parts of the county there are apples. I am told in some parts of the county there will be fruit, but we had severe frosts.
We will hear from Westmoreland county.

MR. SHOEMAKER: On the low lands in our county the strawberries and grapes are frosted and the cherries and peaches in some places; but on the high lands, yesterday as I was driving over the county and got on top of the hill, I found the grapes had not been hurt and the fruit in general not injured, but along the low lands pretty badly frozen. But the wheat and grass I do not think has been affected in our county.

The CHAIRMAN: We will hear from the County Chairman of Schuylkill county.

MR. SHOENER: We had a heavy frost about a week ago and had ice a quarter of an inch thick. The cherries and plums are frozen, and think the frost did not do damage to the apples and pears or any other crop except peaches, perhaps, and the early potatoes which were frozen to the ground.

MR. CLARK: I would like to offer just a suggestion that occurred to me. In my neighborhood I think there is the finest piece of rye I ever saw grow. The morning after the first frost, the heaviest we had, I went along with the owner into this field of rye. The ice had become thawed and in cuttlng open some of the upper joints we found that the little head was started, but frozen, absolutely frozen hard. The next frost came along and we did the same thing and we found that the head was not frozen in this frost. It seems the moisture in the air was sufficient, that while it was cold enough it did not seem to freeze as hard. This rye at the present time is coming out very nicely. The head is out just about ready to turn into a blossom, the blossom beginning to show. Now, we are satisfied it is going to bloom and be a blossom, but what it will do, our past experience leads us to believe, that instead of the head being full, it will be very short of grain in this head. That is our experience in the past.

The CHAIRMAN: In the absence of the member from Berks county we will hear from Berks county through Dr. Funk.

The SECRETARY: The Member of the Board from Berks county is here, Mr. McGowan.

MR. McGOWAN: Dr. Funk is right here and will supplement me. Mr. Chairman, the crops in general of Berks county never looked better, as the rye, oats, wheat and grass fields look elegant, especially clover. Timothy seems a little short. I believe I never witnessed such fine fields of rye, so far as straw is concerned. Brother Clark speaks of the large rye in his section. I took occasion to cull out the tallest and I found that the largest rye stalk measured eight feet five inches in length. This sort of compares with Bob Seeds' cow horn turnips. Mr. Clark possibly measured some of the big rye in his section and possibly can beat it.

The SECRETARY: How is it with the fruit and potatoes?

MR. McGOWAN: The damage by the frost just seems to be a little scare. Someone remarked to me the next morning after the garden vegetables seemed to be injured: "Well, now I don't think that is right." I said: "I believe it is all right, only we don't understand it." That is my reply. I would like to say that yet. So far the frost damage seems to be a little scare. The one end of my potato field was frozen down. When we harrowed them they

were up four or five inches. I noticed on Sunday evening they had recovered nicely. The strawberries are injured, possibly one-third damaged. We had plenty, of course, frozen down, but we can replant the damaged ones because it is not safe to plant them until about the middle of May and we took chances and they froze. My peach orchard is full; could not expect it to look better. The apples also look very promising. Dr. Funk is here and known, not only in our county but over the State, and he will tell you of the prospects of the fruit.

The CHAIRMAN: We will hear from Dr. Funk:

DR. FUNK: Mr. Chairman, you know I come from Berks, and Berks is the home of the Democrats and it is pretty hard to freeze out a Democrat as Brother McGowan can testify. There is comparatively little damage done in my neighborhood; in fact, principally only in extremely low creek bottoms. I have one row of pear trees along the creek bottom. The majority were frozen. But outside of that I have a remarkable stand as I will show later. I have brought along quite a number of cuttings from peach and apples. I think I have apples—our Brother from Lackawanna was speaking about the large size of their peaches,—I will show some as large as they sell in the Scranton market. So, that taking it as a whole, I know of comparatively little damage done. I know nothing of cereals being injured and only strawberries on the low bottoms being injured.

The CHAIRMAN: I was thinking of Lehigh county when I thought the member was not present. Mr. Fenstermacker, the County Chairman is not present but Mr. Wittman, from that county, is here and we will hear from him.

MR. WITTMAN: I happened to be around my county a little lately and such early peas, cherries and strawberries; I never seen any crops like them.

The SECRETARY: There is another Democratic county.

MR. WITTMAN: The only thing likely short is timothy. Our rye is big but our stalks were only seven feet some inches, but they looked big to me.

The CHAIRMAN: We will hear from Jefferson county.

MR. COWAN: Mr. Chairman, we have had considerable frost in our county, but fruit is not all killed. A few strawberry patches were hurt in spots, but we will have plenty of apples and plenty of peaches. The most damage I can see or hear of in other parts of the county, seems to be to the timothy. Clover never was better than at the present time. But the timothy has been injured by frost or something that makes it look very delicate.

The CHAIRMAN: What has Mr. Patterson, of Fulton county, to say?

MR. PATTERSON: Mr. Chairman, we had some very heavy frosts; I think along the Maryland line slight frosts caught us. We notice that the apples are falling off. I have not examined neighboring orchards. Pears are average. We do not know whether peaches suffered. The potatoes there were leveled with the ground and some have to plow up the ground and plant over. Some that came on since are doing well. Clover has a good stand but very short and we fear a short hay crop. The timothy will be later. We will have timothy, but the clover will necessarily be short.

The CHAIRMAN: How about Clinton county, Mr. Herr?

MR. HERR: We have had some frosts too, but I don't think we have been injured seriously. There were a good many cherries frozen and some of the plums, but I notice on my farm, particularly, we have both cherries and plums. I don't know whether the apple crop is injured. I was not in when this question came up. I don't know whether you want to hear of the freezing of crops of all kinds. We had a peculiar season, as most of you had, in March. I started out in March to plow for oats and I sowed that before anything else. I sowed that and I never had such a stand since I farmed as on that ground I sowed that early. Our grass crops, clover, I don't know much; of timothy, I have little myself, but I do think from what I can see that it is very much better than that in the country I have travelled through to get here, especially this western end of the State, as the grass looks bad, while the hay crop is poor. I believe we will have average crops. Some of my potatoes were frozen in the garden, but they are recovering nicely, so that I do not think we will have serious loss from frosts. The crops seem favorable; there will be a good wheat crop.

MR. BLACK: We had a great profusion of fruit blossoms in our region (Mercer county) and I think abundance of fruit on the trees yet. In the valleys, possibly the fruit is injured. There has been no doubt a serious injury done to timothy and the pasture. We had no growth for three or four years on pasture and the timothy meadows. While the weather for past week has been seasonable and grass is growing, I think our hay crop must be short and the pasture is exceptionally short for this time of the year.

The CHAIRMAN: We will hear from Clearfield county.

MR. GEARHART: We not only had frost, but we had nine degrees of freezing, which has practically blotted out the fruit crop of all kinds in valleys. There are in some places apples, peaches and sour cherries on the higher ground. On the lower ground the fruit is killed. I have nearly 400 apple trees. I don't expect to reap a bushel of apples. I cannot find one but what is frozen. The other crops have not been injured beyond recovery. Timothy did look bad until the last four days and there has been a marked change

in vegetation in the past few days. We are going to have a good clover crop. The older meadows are very light. Wheat and rye is good, but we are going to suffer from the fruit crop. There is certainly going to be very little fruit.

The CHAIRMAN: We will hear from Monroe.

MR. BRONG: Mr. Chairman, as far as the grain crops are concerned, I don't think they are hurt by the frost, nor the grass crop. Clover over in our section is good and timothy is fairly good and wheat we do not raise to any extent. We have better prospects for a crop of rye than we have had for a time. The fruit crops have been damaged, most of them, except apples; I don't think there has been any particular damage to them. Peaches, plums, cherries and strawberries, all have been damaged to some extent, perhaps twenty per cent., taking the county over.

The CHAIRMAN: We will hear from Carbon county.

MR. LEINHARD: The fruit crop in our county has been damaged some, although the grain looks fine. We don't raise much wheat; but the strawberry crop and peaches I think have suffered more than anything else.

The CHAIRMAN: We are just now receiving reports from the different sections with regard to the injury done by frosts and this Board would like to hear from Chester county.

DR. CONARD: I think, so far as I can report from Chester county, the frosts have been confined to the low lands. We have had very little damage on the uplands, and it has done no damage on the uplands except the general cold has held back the clover, wheat and grass some. But in some of the low lying ground, I think the fruit has been somewhat injured, and I am told the potato crops have been nipped off close to the ground, but not on high ground. We have had the best set of clover in a great many years. The last two weeks it has been standing pretty nearly still on account perhaps of the uniform cold or low temperature, but the rains are going to loosen it up and help it. The wheat is looking slow, has been standing still. It is well set and pretty well grown. I think the frost has done no harm except on the low ground.

The CHAIRMAN: We would like to hear from Columbia county.

MR. YOUNG: Well, I think the remarks just made by Dr. Conard will apply to our county nicely; about the same conditions as he reported for Chester county, although we are much further up the river. Very little injury has been done by the frost. Our wheat looks fine. There are some spots, some low lying fields that had depressions where the water stood and froze in the winter time; there are some such spots, but it amounts to little, so that our prospects for a wheat crop are certainly up to the average. It would

make 100 per cent. I think, safely. In regard to the growth of the clover, the grass and all that, what was reported by Dr. Conard applies to our county.

The CHAIRMAN: We will hear from Northampton county now.

MR. MESSINGER: I do not know that the frost has done any damage in our county. Fruit looks pretty good. I don't think anything suffered but peaches and cherries from cold and wet. I had heard the Doctor make the remark here that he had some apples and pears here. I did not bring any. I have some pear trees that if 50 per cent. would mature the trees would not be able to bear them at all. As far as grain and grass is concerned, I have travelled some north and some south and west through the State and I don't think we have to except any; that we have just as good as any we see throughout the State; our grain especially I never seen looking better. As I said before, I haven't heard anything. I heard of frost but no damage. We did not have any frost at all in our section.

The CHAIRMAN: Is there any person we have missed?

MR. McGOWAN: While I am from the southern section of Berks county, we have a gentleman representing our county from the northwestern part. I refer to Mr. M. H. McCallun, of Wernersville. This gentleman tells about the condition of a crop not mentioned by any of the preceding speakers: that is alfalfa. I understand he has 60 acres of alfalfa under cultivation, and as we passed by yesterday on the cars his fields looked splendid. I think you will enjoy hearing him speak of the condition of the crops, in general, in his section as well as about the alfalfa.

The CHAIRMAN: We will be pleased to hear from Mr. McCallon.

MR. McCALLUN: What has been heard here I think applies to my part of the county; especially in the southern part of Berks I find that some of the fruit is injured, some of the cherries, but there are sufficient left to give us a good crop. Strawberries, the half of the early blossoms matured and we had some nice big berries from the first blossoms, while those more tender were nipped. But we have a splendid outlook for a strawberry crop. Taking all in all, I think that in our part we can look for splendid returns from the fruits and grasses and grains. I see no reason why we should not. I think I never saw the clover fields as pretty before. I was anxious that Mr. McGowan should see them as we passed. They are splendid. As to alfalfa, that it what I am interested in, I would not like to take your time to tell you about it. It is interesting to me, but may not be to the members here.

The SECRETARY: There is nothing that will interest this audience more than alfalfa. We are very anxious to know all you can tell us about it.

MR. McCALLUN: I will be pleased to give you a brief talk on it because I am interested in it and have had the experience of growing it and feel that I have got it; that it is as easy to grow

it as "falling off a log" if we only have heart. There are some things that have to be observed in order to be successful. I might mention a few of them. Ground inoculation. There are very important points to be regarded. Of course, inoculation we know is very essential. I have been growing it eight years. This is on the State ground. When I started the growing of it, I had the idea the inoculation was merely humbug. I saw in the agricultural papers it was necessary and yet I could not conclude that way; but when I sowed my first crop I had confidence enough to get a peck of soil from my father-in-law's field and sow it in my own in a small block, perhaps thirty feet square. I was careful to mark the margin so that I could see it. I found in the fall that it was growing nicely; a splendid crop. In the Spring it looked as well as the red clover, but after awhile that first soil began to get yellow.

Of course, it was the first year I had charge of the work and I was anxious to make things grow, and, of course, this going back was a hard thing to see and I had to do something and I began to make experiments. We had small plots and I used the various fertilizers and also manure and I suppose I had eight or nine plots and it was not long until the first rain. About two or three days after the first rain I saw where I had applied the nitrogen in combination and single form. That was just what was needed. Where I had inoculated, that patch the alfalfa was away up, again as high as the other part of the field. There was nitrogen enough in the soil to start the crop, but when it began growing in May there was not enough available nitrogen there, and because the bacteria was naturally over the greater part of the field, it began to get yellow; and the whole thing of it was, that there was not sufficient nitrogen there to make it grow. The bacteria were working. Inoculation is necessary; there is no doubt about it. I should say one-fifth of the field had the bacteria supplied naturally, but I found that over the entire farm, taking in the whole, I had to inoculate it. I am practicing a three-years stand of alfalfa. Most of the growers leave their alfalfa as long as it does well and seem to think that is the best way, but I look at it different. I cannot afford to let it stand longer than three years. That is the way I look at it. I have tried the alfalfa sod for potatoes and I am satisfied that we have to have it for potatoes when you can get it. Last year was my first experience in putting potatoes in alfalfa sod and I had the opportunity of comparing alfalfa sod with red clover sod, and if there was any choice previous to harvesting I should have given it to the clover sod, but when it came to harvesting the potatoes I got 20 bushels per acre off the alfalfa sod above that crop harvested from the red clover fields. Now, then, we used the same potatoes, the same fertilizers, planted in fact the same way within two or three days of each other, and I am satisfied to spend $75.00 each year to put out twenty acres of alfalfa and turn down twenty acres out of that for potatoes.

I think alfalfa is one of the greatest things for our country we can have. The more we grow of it the more I think of it. Just last week—I can't help telling you a little of my experience in feeding to the dairy. I have a dairy of 80 head. Heretofore I have had silage sufficient to run me through the greatest part of the summer. Last summer I was glad for it. I fed it all summer. This summer

when my alfalfa began to get large I started to feed it. I have been feeding it for three weeks now and on looking over my record last Saturday, the last week's report from my cattle gives me this: Comparing last week's with the same week last year and for the two years, I find that we just milked one more cow this year and I have 1,200 pounds more milk from my 40 or 44 head; almost 1,200 pounds more of milk for the week, comparing the feeding of the silage with the alfalfa.

The SECRETARY: Now, let me ask you, would you furnish some of the soil to people who would like to buy. Are you in condition to do that?

MR. McCALLUN: There have a number of parties gotten soil from me. I have never sent it away. I have been supplying to my neighbors free of charge, whoever applied for it and would be very glad to do that; but as to sending it away, that is not for me to say. It is State property, the Asylum at Wernersville, Pa. I do not know what they would choose to do.

The SECRETARY: It is important to be a little chary about sending State property away.

MR. McCALLUN: The getting yellow of that alfalfa was simply the lack of nitrogen. This is a rambling talk and I am sorry I started out because I like to know where I am getting when I start. When I come to a speech like this I do not know where I am getting.

As soon as I knew nitrogen was the thing needed, and this little experimental plot of inoculated soil showed me that bacteria is what is lacking, and that is what is needed—so after cutting the first crop I went to work and put over the tract about 300 pounds of inoculated soil and that was the end of all my trouble. Thereafter I inoculated the soil first.

The SECRETARY: How many pounds of the soil on which it has grown is it necessary to use to inoculate an acre?

MR. McCALLUN: Something like 300 pounds to 500 pounds to the acre. I have an easy way of doing it. I get a number of patients, give each one a dish pan to carry the inoculated soil, line them up and let them go over the field and distribute it.

The SECRETARY: You could put it on with the drill the same as fertilizer?

MR. McCALLUN: Just as nicely. Of course, you would have to seive it first.

On the 1st of last August I sowed 17 pounds of alfalfa to the acre. It never germinated. This Spring it germinated and it is growing there now. There must not have been enough moisture in the soil to germinate it when sowed. My plans almost failed through the dry spell. I started a good bit earlier than that. My practice is to start after taking off the first crop, about the beginning of July.

That gives me ample time to plow and give thorough cultivation. Last Summer it was just too dry and hard to do it, so I could not plow and prepare the soil that has to go ahead of it but as I was anxious we sowed. I just wish you could have seen what a wonderful crop of weeds we had there and what a nice crop of alfalfa we have this Spring. Of course, they were merely Fall weeds and the alfalfa this Spring has taken advantage and I don't expect trouble in regard to them. I don't know what the reason was for not germinating last Fall, unless it was too dry and not enough moisture in the soil to germinate.

A Member: What is the nature of your soil?

MR. McCALLUN: Very much the same soil that you find at State College, Centre county.

MR. CLARK: May I take the time to tell you an alfalfa story?

The CHAIRMAN: Just wait until we hear from Butler county. We have been taking the reports from the different counties in regard to the injury by the frost. We would like to hear from Butler county.

MR. BARTLEY: I don't think the frost has done a great deal of damage in Butler county as far as I can find out; unless on some kinds of cherries, on what they call the sour cherries, not the black hearts but the sour cherries at my place are killed. I have 1,400 feet of elevation. They are killed. Of course, they will be killed at a lower elevation. As to the damage to the growing clover on account of the cold, I might say it is recuperating now and doing fine this last week or two.

The CHAIRMAN: Now we will be pleased to hear from Mr. Clark.

MR. CLARK: One of my neighbor's sons was farming for quite a number of years on an excellent farm. Several years ago he got discouraged with this country, and, like many more, he went West. He went out in the alfalfa regions and by and by he got tired out there and he came home last March a year ago and when he came home he brought alfalfa seed with him, and he said, "I am going to raise alfalfa here." His father had tried and had failed to raise it. He went out on a good piece of limestone land, dry and well drained and he sowed the alfalfa about the time of planting potatoes, this Spring a year ago, sometime about the 1st of May. It growed very nicely. He clipped it three times last year and I want to tell you that there is as pretty a stand of alfalfa on that ground as you want to see grow and he had no inoculation on it. He has another piece sowed about two weeks ago and nothing with it at all and he expects to grow it and don't see why there is any need of it. There is another side of it. This is only what we see right here.

MR. McCALLUN: There is no mistake about it. We need the soil. Different parts of the State naturally have the bacterial mat-

ter. The soil is full of it but we want to safeguard, and I think it is safest to inoculate the soil for alfalfa.

MR. SEAVY: Mr. Chairman, I want to supplement some of this talk from Brother McCallun, of Berks. Mr. McCallun went through our county last winter, attended our institutes, and he told some things about the alfalfa raising. A great many farmers in our county are discouraged. The reason they failed, is because they sowed it among the weeds, and oats, and other grain and tried to raise two crops at once. It is impossible. I am very much encouraged about alfalfa raising. I believe that we can raise alfalfa, and that we can save these immense feed bills with it. It seems as if we milk 20 to 30 cows, and when we get our pay that we take the check and go to the mill and pay it over for the feed. That about all we get from it is a little increase in the fertility of the land from the manure we get from the cows. Now, I have been trying for the last five years to raise alfalfa. The first year I might call a failure. I knew nothing about it at that time, about the bacteria, and I sowed it on the ground without using or sowing any of the bacteria; but there were some spots in the field of two acres that it did grow. The next year, after clipping it once or twice, we plowed that down and took soil from these spots in the field where the alfalfa had grown the rankest and spread it over the field and we got a better stand, but not perfect.

But there is another thing. I was not particular about buying seed, and I got some 15 to 17 kinds of weeds seeds I have never heard of. We have not succeeded altogether. Now I am buying seed from a party that guarantees. This last year I sowed three acres. We have sandy and clay lands. I sowed an acre on each. Very much to my surprise the alfalfa on the clay land is doing the best and I have a beautiful stand there now, a stand that I am not ashamed of. It was my privilege to attend a Pomona Grange and I took a bundle of alfalfa with me and I was asked to explain about it, and while I was talking about it a man got up in the audience and said, "I know you can't do it; you have got to have an alkali soil." I said, "I know we can grow it and if you come to my place I will show it to you." I am very much encouraged to know that we can raise alfalfa in this State and it is going to be an immense benefit to our farmers.

DR. CONARD: I would like to ask Mr. McCallun a question. I live in a section of the State where there is a great deal of composted manure available. This manure comes out of the mushroom beds; horse manure from hard worked horses in the cities. It is composted and then put on the benches. This is a very nice top dressing for grass. It is short and I just wanted to ask if you thought that would be a good top dressing for alfalfa and still need add some inoculated soil with it on the manure spreader.

MR. McCALLUN: As to the manure, that is a point I forgot to mention. The soil wants to be well filled with humus; vegetable matter. That is one of the essentials and horse manure has nitrogen and, of course, that is good as well. But the phosphoric acid has been pretty well taken out of it. That furnishes organic matter;

but I like to know that there is a little nitrogen as well. As to putting the manure on with inoculated soil, I would rather not, I believe. My preference would be after the soil is practically ready to seed, just a week or a few days previous to seeding, I would spread the inoculated soil over the field and harrow it in and then seed it afterward. I don't think I would put it on with the manure. It might be well and yet it might be far out of the way.

DR. CONARD: This manure is so short it would be harrowed in with the disk harrow.

MR. McCALLUN: That would be all right unless it should stimulate immediate growth.

DR. CONARD: The weeds are pretty well killed with the heating process. It is practically free of weed seeds because of the process of composting.

A Member: When do you like to sow it?

MR. McCALLUN: I like to stick to my time. That gives opportunity to thoroughly prepare the seed bed and plant about the 5th of August.

DR. CONARD: After you dug up the first crop of potatoes?

MR. McCALLUN: Yes, I would like to because I have got use for it; but my early potatoes don't come up quite early enough. If I could market my crop, it would be all right, but as I use the early potatoes right from the field, it goes too slow.

DEPUTY SECRETARY MARTIN: I note in our audience a gentleman who is a resident of the county and city and who, for many years, served on the Board of Agriculture, and as Chairman of County Institutes, Mr. Riddle. I think we would like to hear from Mr. Riddle.

The CHAIRMAN: We will be pleased to hear from Mr. Riddle.

MR. RIDDLE: I am very glad to see so many members of the Board of Agriculture with us and glad to meet again those I used to meet with years ago. I do not know, Mr. Chairman, that I can add much to what has been said in regard to the conditions of the crops in this county, because I confine myself to the city for many years and have not been out very much, probably passing over the ground betwen this and Pittsburg once or twice; but I am unable to say what effect the frost has had on the crop conditions in this county. I can only say what I learn from farmers that come in, and you know how it is with farmers that always look at the black side of everything. I met two or three and I asked them how the fruit was affected by the frost. "Oh, everything is killed," they said. I said, "Did you look and examine?" "No: I didn't look and examine; but I know they are killed," they said. That is one of the troubles with the farmers generally. They are always willing to

look at the dark side. I think, however, that the conditions that exist, as they affect other counties, have affected this county in the same way. I know some sections of this county that never fail to have frosts that are very damaging, and particularly this season when the frosts are so severe. I cultivate a great deal of early stuff myself in a small way and I know what effect it has had here in the town. However, I believe I have a better garden than I had in my life this time of the year. It depends very largely on what conditions you produce, as my friend Dr. Funk says about his fruit culture. I think one can produce conditions that help along a great deal and I think we must all look at that view of it and that we will succeed a great deal better in raising crops of all kinds.

I am very glad, gentlemen, I have been called to meet with you and hope you will enjoy the meeting at Butler; and I want to say while I am before you that we have a great many things in Butler that I want you to see. We have a very beautiful park a few miles out and if it would be convenient to hold one of the meetings out there, I spoke to the superintendent and he said we could have anything we wished. We have some good buildings and there is a theatre and pavilion and I extend an invitation to the Board, if it don't care to hold a session there. to at least take a trip out to see the very beautiful park that is there and the spring that supplies everything that the honest man needs to drink, the very best of spring water. We have a large steel car works in Butler and a large plate glass works which will be interesting, and I hope the gentlemen who are here will take time to look around and see. The car works is among the largest in the world and they have been run successfully for a number of years. They ran thirteen consecutive months before they stopped at last time. They produced 101 complete cars each day for thirteen consecutive months. These cars sell at $1,000 each, so you can have some idea what the works are. At present they are enlarging them and they cost something like three and a half million dollars. I am simply mentioning these things that you may take the opportunity to view these works.

The CHAIRMAN: Is there any other business before the Board this morning?

MR. SEAMANS: There is one of our members strayed away this morning, but he has come into the meeting since we have been talking and this is a brother from Bradford county, I don't recall the name, but he started out with us yesterday and he stayed with us last night and this morning some way in the shifting of trains he got lost and came in after this discussion as to the damage done by the frost in the different counties. I believe we have not heard from Bradford county as to the damage done by the frosts.

The CHAIRMAN: We will now hear from Brother Kerrick, of Bradford county.

MR. KERRICK: Our farmers are enthusing over their crops, and I will have a report for you that the prospects are very fair indeed, and we are not affected with the frosts. We have a first-class crop of wheat. The meadows I may report are affected from

the drought last season, but the conditions, generally speaking, are good. Some of the farmers are very enthusiastic over the crops for the coming season. The corn and potatoes are all planted and the condition of the soil has been very nice to work so far.

I am glad to meet with you in the city of Butler although I am some distance from here and have been rambling around over the mountains since seven o'clock yesterday morning, and I am very glad to meet my friends whom I met at Harrisburg last Winter and trust this will be a successful meeting.

DEPUTY SECRETARY MARTIN: The gentlemen from the various counties have expressed a spirit of hopefulness for crops, and I note with respect to one county in Pennsylvania in which we all have more pride than any other, Lancaster county, that a representative from that county has just come in. I know we will all be interested in hearing from J. Aldus Herr for a few minutes telling us of the conditions of crops in that county, the banner county of the United States.

The CHAIRMAN: We will be pleased to hear from Mr. Herr.

MR. J. ALDUS HERR: I thank you for the opportunity. Although not being a member of your Board, I came here to attend this meeting and also the meetings that will be in session later.

With reference to the early frosts or late frosts in Lancaster county, there has not been as much damage done in our county as some persons suspect and the prospects, as far as crops are concerned, are good. Our wheat never was better, our grass is fair, most of the corn is up, some of the tobacco is planted and all we want is good weather.

The CHAIRMAN: Is there any other business to come before the Board?

The SECRETARY: Now, Mr. Chairman, I guess we are very close to the hour of adjournment, and before we adjourn, I want to thank the members of the Board, personally, for the encouragement they offer from the various sections of the State. As I said a little while ago, we have been having such conflicting stories at Harrisburg as to the injury done by the frosts in the various sections of the State, that we scarcely knew what to answer when anybody talked to us about it. Not as a member of this Board, but as the head of the Department of Agriculture, I want to thank you for the very cheering report you have brought us.

And with regard to the alfalfa question, the thought came to me while you were talking, that it would be an excellent thing if every member of the Board would try a patch of alfalfa of not more than half an acre. If you succeed, it will be plenty for your chickens, if you don't have any more. I thought a great deal last year about inaugurating a regular system of experiments in the State, and it seemed to me that it was so uncertain, from the information we were getting, that I gave the matter up. It would be a splendid thing. You would be doing a good work for the farmers of the State if the

representatives of this Board would try a little piece of alfalfa and see what you can do with it and then make a report to the Board. I believe there is nothing that will be of greater, or more importance to the agriculture of Pennsylvania than the demonstration of our ability to succeed here in the production of alfalfa. I don't know whether we will ever be able to succeed in producing alfalfa that will measure up to Brother McGowan's rye or to Brother Funk's pears that he is going to exhibit and, by the way, while they were talking about that, the story of the Scotch minister came to my mind which you will excuse me for telling in this connection.

The minister said to one of his elders: "Elder McCracken, I would like you to tell me what the people be a saying about me." The elder felt a little dubious about conveying this intelligence to the minister and told him so. The minister said he ought to know for the good of the work. So Elder McCracken said: "They be saying that you be given to exaggeration." The minister said: "Well, may be that be true. I wish you would always sit close to me and if you think I am exaggerating you will clear up your throat and give me warning. So one Sunday morning he took for his text "Samson and the Foxes Tails," and he said the tails of those foxes were 35 feet long. "A-hem; a-hem." "But I tell you, my brethren, I don't believe it. I think if they reached 25 feet that will be long enough. "A-hem," another warning came. And he said: "The truth of the matter is, so far as the tails are concerned, I don't believe they would measure over 20 feet." "A-hem; a-hem." "Elder McCracken, I'll never take another inch off those tails if you clear your throat until Doom's Day."

I suppose Brother McGowan is not going to take an inch off that stalk of rye and Brother Funk is not going to take an ounce off those pears.

I have been very much gratified over the good reports that have come in from all over the State. I was feeling a little blue. I was not at my farm for several months. One of my daughters was there and she told me last evening, "There are a few cherries, I think there are a few apples left but the strawberries are all gone," and that hurt me. I always like to get strawberries right fresh from the bush. The farmer reported that there was going to be a shortage in the hay crop and I told him he had better order some millet and put it out. I think that is a good thing if cut at the right time and put in right and it makes a very good substitute for timothy hay.

I thank you, as I said before, for the cheering reports which you have brought from all over the State.

MR. HERR: Mr. Chairman, I move the Board adjourns.

DEPUTY SECRETARY MARTIN: Mr. Chairman, before we adjourn, I wish to call the attention of those present to the program for this afternoon. Promptly at 1.30, the Address of Welcome will be delivered by Judge Galbraith, who presides at this court. This address I know we shall all be glad to hear and I ask you all to be in your places promptly. The responses to the Address of Welcome will be delivered by our friends, Messrs. Lighty and Kester. These responses will be followed by an address on "The Farmer a

Manufacturer," by Prof. Franklin Menges, of York, Pa. We should have ample time to discuss this address.

MR. HERR: I renew my motion to adjourn until the next regular meeting of the Board at Harrisburg, Pa., in January, 1911.

The motion was seconded, put and agreed to.

Whereupon the Board adjourned at 11.40 A. M.

N. B. CRITCHFIELD,
Secretary.

LIST OF COUNTY INSTITUTE MANAGERS FOR SEASON OF 1909-10.

County.	Name and Address of Chairman.
Adams,	A. I. Weidner, Arendtsville.
Allegheny,	A. J. Purdy, Imperial R. F. D.
Armstrong,	S. S. Blyholder, Kelley Station.
Beaver,	A. L. McKibben, New Sheffield.
Bedford,	David W. Lee, Bedford.
Berks,	Howard G. McGowan, Geiger's Mills.
Blair,	Howard Cox, Bellwood,
Bradford,	F. D. Kerrick, Towanda, R. F. D. No. 9.
Bucks,	Watson T. Davis, Ivyland.
Butler,	N. F. Bartley, Euclid.
Cambria,	H. M. Gooderham, Patton, R. F. D. No. 1.
Carbon,	
Center,	L. E. Stover, Aaronsburg; Leonard Rhone, Center Hall; E. W. Sweeney, Boalsburg, Local Chairmen.
Cameron,	W. H. Howard, Emporium.
Chester,	Dr. M. E. Conard, Westgrove.
Clarion,	S. X. McClellan, Knox.
Clearfield,	Peter Gearhart, Clearfield.
Clinton,	Joel A. Herr, Millhall, R. F. D.
Columbia,	A. P. Young, Millville.
Cumberland,	T. J. Ferguson, Mechanicsburg.
Crawford,	J. F. Seavy, Saegerstown.
Dauphin,	S. F. Barber, Harrisburg.
Delaware,	E. J. Durnall, Swarthmore.
Elk,	J. B. Werner, St. Mary's.
Erie,	Archie Billings, Edinboro.
Fayette,	T. H. Smith, Dunbar, R. F. D. No. 32.
Forest,	C. A. Randall, Tionesta.
Franklin,	J. P. Young, Marion.
Fulton,	J. L. Patterson, McConnellsburg.
Greene,	J. W. Stewart, Jefferson.
Huntingdon,	G. G. Hutchison, Warrior's Mark.
Indiana,	S. C. George, West Lebanon.
Jefferson,	Peter B. Cowan, Brookville.

County.	Name and Address of Chairman.
Juniata,	Matthew Rodgers, Mexico.
Lackawanna,	Horace Seamans, Factoryville.
Lancaster,	J. Aldus Herr, Lancaster, R. F. D.
Lawrence,	Sylvester Shaffer, New Castle, R. F. D. No. 3.
Lebanon,	Edwin Shuey, Lickdale.
Lehigh,	P. S. Fenstermaker, Allentown.
Lycoming,	A. J. Kahler, Hughesville.
Luzerne,	J. E. Hildebrant, Dallas, R. F. D.
McKean,	O. W. Abbey, Tuttle Point.
Mercer,	W. C. Black, Mercer.
Mifflin,	M. M. Naginey, Milroy.
Monroe,	F. S. Brong, Saylorsburg.
Montgomery,	Jason Sexton, North Wales.
Montour,	J. Miles Derr, Milton, R. F. D. No. 1.
Northampton,	C. S. Messinger, Tatamy.
Northumberland,	I. A. Eschbach, Milton, R. F. D. No. 1.
Perry,	A. T. Holman, Millerstown.
Philadelphia,	J. B. Kirkbride, Bustleton.
Pike,	B. F. Killam, Paupack.
Potter,	H. H. Hall, Ellisburg.
Schuylkill,	W. H. Stout, Pinegrove.
Snyder,	Chas. Miller, Salem.
Somerset,	J. C. Weller, Rockwood, R. F. D. No. 2.
Sullivan,	E. R. Warburton, Campbellsville.
Susquehanna,	F. E. Davies, Montrose.
Tioga,	E. B. Dorsett, Mansfield.
Union,	J. Newton Glover, Vicksburg.
Venango,	W. A. Crawford, Cooperstown.
Warren,	Geo. A. Woodside, Sugargrove.
Washington,	D. S. Taylor, Burgettstown.
Wayne,	W. E. Perham, Pleasant Mt., R. F. D. No. 3.
Westmoreland,	M. P. Shoemaker, Greensburg.
Wyoming,	D. A. Knuppenburg, Lake Carey.
York,	G. F. Barnes, Rossville.

LIST OF INSTITUTE LECTURERS FOR SEASON OF 1909-10.

Agee, Prof. Alva, State College, Pa.
Anderson, H. M., New Park, Pa.
Baker, Miss Adaline C., Kennett Square, Pa.
Bond, M. S., Danville, Pa.
Bruckart, J. W., Lititz, Pa.
Callahan, Ellery E., Ferenbaugh, N. Y.
Campbell, J. T., Hartstown, Pa.
Card, Fred W., Sylvania, Pa.
Carter, Miss Arabella, No. 1305 Arch St., Philadelphia, Pa.
Clark, M. N., Claridge, Pa.
Conard, Dr. M. E., Westgrove, Pa.
Cooke, Prof. Wells W., U. S. Dept. of Agriculture, Washington, D. C.
Cornman, Chas. T., Carlisle, Pa.
Cox, John W., New Wilmington, Pa.
Detrich, Dr. J. D., No. 438 Adams Ave., Scranton, Pa.
Dockey, Elmer E., Elizabethville, Pa., R. F. D.
Doty, S. W., State College, Pa.
Dorsett, E. B., Mansfield, Pa.
Drake, W. M. C., Volant, Pa.
Eschbach, I. A., Milton, Pa., R. F. D. No. 1.
Fassett, F. H., Meshoppen, Pa.
Funk, Dr. J. H., Boyertown, Pa.
Gardner, Prof. Frank D., State College, Pa.
Gooderham, H. M., Patton, Pa., R. F. D.
Herr, Joel A., Millhall, Pa., R. F. D.
Herr, Prof. John D., Division of Economic Zoologist, Harrisburg, Pa.
Hoover, E. S., Lancaster, Pa., R. F. D.
Hull, Geo. E., Transfer, Pa., R. F. D.
Jackson, Homer W., State College, Pa.
Kahler, A. J., Hughesville, Pa.
Kester, R. P., Grampian, Pa.
Larson, C. W., State College, Pa.
Ledy, J. H., Marion, Pa.
Lighty, L. W., East Berlin, Pa.
Lovejoy, Miss Sara C., State College, Pa.

Mairs, Prof. T. I., State College, Pa.
McCurdy, Clarence C., Hartstown, Pa.
McDowell, M. S., State College, Pa.
Menges, Prof. Franklin, York, Pa.
Myers, Prof. C. E., State College, Pa.
Noll, Prof. Chas. F., State College, Pa.
Northup, Henry W., Dalton, Pa., R. F. D. No. 1.
Orr, Mrs. T. E., Beaver, Pa.
Owens, Prof. Wm. G., Lewisburg, Pa.
Peachey, J. H., Belleville, Pa.
Penny, Prof. Chas. L., State College, Pa.
Philips, T. J., Atglen, Pa.
Phillips, E. L., New Bethlehem, Pa., R. F. D. No. 2.
Phillipy, Dr. W. T., Carlisle, Pa.
Pillsbury, Dr. J. P., State College, Pa.
Posten, B. Monroe, Sheakleyville, Pa.
Rich, Chas. H., Woolrich, Pa.
Ross, A. B., Bedford, Pa.
Seeds, Robt. S., Birmingham, Pa.
Shaw, Prof. Chas. F., State College, Pa.
Stephens, A. Woodward, Hebron, Ohio.
Stewart, Prof. J. P., State College, Pa.
Stout, W. H., Pinegrove, Pa.
Thomas, Miss Sara Phillips, Wayne, R. F. D. No. 1.
Van Norman, Prof. H. E., State College, Pa.
Van Noy, Leon Otice, Troy, Pa., R. F. D. No. 3.
Wallace, Mrs. Mary A., Beechwood and Shaw Aves., Pittsburg, Pa.
Watts, Prof. R. L., State College, Pa.
Watts, D. H., Kerrmoor, Pa.
Weld, R. J., Sugargrove, Pa.
Wittman, W. Theo., Allentown, Pa.
Wolff, Wm. H., No. 116 North 51st St., Philadelphia, Pa.
Woodman, S. Paul, Rushland, Pa.
Zeigler, Mrs. Sarah B. F., Duncannon, Pa.

MEETING OF THE FARMERS' ANNUAL NORMAL INSTITUTE.

PROGRAM.

First Session Convenes Tuesday Afternoon, May 24, 1910.

MR. N. F. BARTLEY, Euclid, Pa., Chairman.

Call to order 1.30.

Address of Welcome, by Judge James M. Galbraith, Butler, Pa.

Responses, by Messrs. L. W. Lighty, East Berlin, Pa.

R. P. Kester, Grampian, Pa.

1. "THE FARMER A MANUFACTURER."

Prof. Franklin Menges, York, Pa.

Note: After each topic is presented, 15 minutes will be occupied in general discussion.

Tuesday Evening, May 24, 1910.

MR. SYLVESTER SHAFFER, New Castle, Pa., Chairman.

Call to order 7.30.

1. "THE STARTING OF AN ORCHARD."

Prof. W. J. Green, Wooster, Ohio.

2. "SPRAYING, THE SHEET-ANCHOR OF SUCCESS."

Dr. J. H. Funk, Boyertown, Pa.

3. "FERTILIZATION AND CULTURAL METHODS FOR APPLE ORCHARDS."

Prof. J. P. Stewart, State College, Pa.

(Illustrated by lantern slides.)

Wednesday Morning, May 25, 1910.

MR. W. C. BLACK, Mercer, Pa., Chairman.

Call to order 9.00.

1. "PROFITABLE BREEDING AND FEEDING OF BEEF CATTLE."

Mr. O. E. Bradfute, Xenia, Ohio.

2. "BEEF CATTLE; THEIR RELATION TO AGRICULTURE IN PENNSYLVANIA."

Prof. W. A. Cochel, State College, Pa.

3. "CONTROL OF INFECTIOUS DISEASES OF ANIMALS."

Dr. S. H. Gilliland, State Veterinarian, Harrisburg, Pa.

Wednesday Afternoon, May 25, 1910.

MR. W. A. CRAWFORD, Cooperstown, Pa., Chairman.

Call to order 1.30.

1. "PRACTICAL METHODS OF POTATO GROWING."
Mr. E. A. Rogers, Brunswick, Maine.

POULTRY INDUSTRY:

2. "SOME MODERN POULTRY PROBLEMS."
Mr. J. T. Campbell, Hartstown, Pa.

3. "SOME REASONS FOR POOR HATCHES."
Mr. W. Theo. Wittman, Allentown, Pa.

Wednesday Evening, May 25, 1910.

MR. S. S. BLYHOLDER, Neale, Pa., Chairman.

Call to order 7.30.

1. "THE FARMER AND HIS RECREATION."
Rev. Enos H. Hess, Lancaster, Pa.

2. "EDUCATIONAL UTILITY."
Dr. Edwin E. Sparks, President State College, State College, Pa.

3. "AGRICULTURE IN SOUTH AMERICA."
Prof. E. M. Baxter, Mifflinburg, Pa.
(Illustrated with lantern slides.)

Thursday Morning, May 26, 1910.

MR. H. M. GOODERHAM, Patton, Pa., Chairman.

Call to order 9.00.

1. "ECONOMICAL MILK PRODUCTION."
Prof. Edwin Van Alstyne, Kinderhook, N. Y.

2. "THE PROTEIN REQUIREMENTS OF THE DAIRY COW."
Prof. Wells W. Cooke, U. S. Dept. of Agriculture, Washington, D. C.

3. "COW TESTING ASSOCIATIONS."
Mr. Helmer Rabild, U. S. Dept. of Agriculture, Washington, D. C.

Thursday Afternoon, May 26, 1910.

MR. HOWARD COX, Bellwood, Pa., Chairman.

Call to order 1.30.

GENERAL FARMERS' INSTITUTE SESSION:

1. "THE REQUISITES OF A GOOD INSTITUTE WORKER."

Prof. Edwin Van Alstyne, Kinderhook, N. Y.

2. "WHAT CONSTITUTES A GOOD COUNTY CHAIRMAN OF INSTITUTES."

Hon. Howard G. McGowan, Geiger's Mills, Pa.

Note: This session will be devoted to the general work of Farmers' Institutes throughout the State. The discussion is open to County Chairmen, Institute Lecturers and others. Not longer than five minutes can be allotted to one speaker, other than the opening addresses.

Thursday Evening, May 26, 1910.

MRS. MARTHA E. MARTIN, Harrisburg, Pa., President.

Call to order 7.30.

WOMAN'S SESSION:

1. "MOTHERS AS CHUMS."

Miss Arabella Carter, No. 1305 Arch St., Philadelphia, Pa.

2. "DOMESTIC SCIENCE AND HIGH COST OF LIVING."

Miss Sara C. Lovejoy, State College, Pa.

3. "WOMEN'S SHARE IN AGRICULTURE."

Miss Martha Van Rensselaer, Ithaca, N. Y.

Friday Morning, May 27, 1910.

MR. M. P. SHOEMAKER, Greensburg, Pa., Chairman.

Call to order 9.00.

1. "DIFFICULTIES ENCOUNTERED IN ENFORCING THE PURE FOOD LAWS."

Mr. James Foust, Dairy and Food Commissioner, Harrisburg, Pa.

2. "SOME THINGS OUTSIDE THE FARMYARD GATE."

Mr. Fred W. Card, Sylvania, Pa.

3. "HOW TO RAISE CROPS WITHOUT WEEDS."

Dr. J. D. Detrich, No. 438 Adams Avenue, Scranton, Pa.

Closing Remarks and Adjournment.

The roll calls showed the following Institute Managers to have been present:

County.	Name and Address of Chairmen.
Adams,	A. I. Weidner, Arendtsville.
Allegheny,	A. J. Purdy, Imperial, R. F. D.
Armstrong,	S. S. Blyholder, Kelly Station.
Beaver,	A. L. McKibben, New Sheffield.
Berks,	Howard G. McGowan, Geiger's Mills.
Bradford,	F. D. Kerrick, Towanda, R. F. D. No. 9.
Bucks,	Watson T. Davis, Ivyland.
Butler,	N. F. Bartley, Euclid.
Cambria,	H. M. Gooderham, Patton, R. F. D. No. 1.
Carbon,	.....
Chester,	Dr. M. E. Conard, Westgrove.
Clarion,	S. X. McClellan, Knox.
Clearfield,	Peter Gearhart, Clearfield.
Clinton,	Joel A. Herr, Millhall, R. F. D.
Columbia,	A. P. Young, Millville.
Cumberland,	T. J. Ferguson, Mechanicsburg.
Crawford,	J. F. Seavy, Saegerstown.
Erie,	Archie Billings, Edinboro.
Franklin,	J. P. Young, Marion.
Fulton,	J. L. Patterson, McConnellsburg.
Greene,	J. W. Stewart, Jefferson.
Indiana,	S. C. George, West Lebanon.
Jefferson,	Peter B. Cowan, Brookville.
Lackawanna,	Horace Seamans, Factoryville.
Lancaster,	J. Aldus Herr, Lancaster, R. F. D.
Lawrence,	Sylvester Shaffer, New Castle, R. F. D. No. 3.
Lebanon,	Edwin Shuey, Lickdale.
Lycoming	A. J. Kahler, Hughesville.
Luzerne,	J. E. Hildebrant, Dallas, R. F. D.
Mercer,	W. C. Black, Mercer.
Mifflin,	M. M. Naginey, Milroy.
Monroe,	F S. Brong, Saylorsburg.
Montour,	J. Miles Derr, Milton, R. F. D. No. 1.
Northampton,	C S. Messinger, Tatamy.
Northumberland,	I. A. Eschbach, Milton, R. F. D. No. 1.
Perry,	A. T. Holman, Millerstown.
Snyder,	Chas. Miller, Salem.
Somerset,	J. C. Weller, Rockwood, R. F. D. No. 2.
Sullivan,	E. R. Warburton, Campbellsville.
Tioga,	E. B. Dorsett, Mansfield.

Union, ...J. Newton Glover, Vicksburg.
Venango, ... W. A. Crawford, Cooperstown.
Warren, ... Geo. A. Woodside, Sugargrove.
Wayne, ... W. E. Perham, Pleasant Mt., R. F. D. No. 3.
Westmoreland, ... M. P. Shoemaker, Greensburg.
York, ... G. F. Barnes, Rossville.

The roll calls showed the following Institute Lecturers present:

Anderson H. M., New Park, Pa.
Baker, Miss Adaline C., Kennett Square, Pa.
Bond, M. S., Danville, Pa.
Bruckart, J. W., Lititz, Pa.
Callahan, Ellery E., Wellsboro, Pa.
Campbell, J. T., Hartstown, Pa.
Card, Fred W., Sylvania, Pa.
Carter, Miss Arabella, No. 1305 Arch St., Philadelphia, Pa.
Clark, M. N., Claridge, Pa.
Conard, Dr. M. E., Westgrove, Pa.
Cooke, Prof. Wells W., U. S. Dept. of Agriculture, Washington, D. C.
Cornman, Chas. T., Carlisle, Pa.
Cox, John W., New Wilmington, Pa.
Detrich, Dr. J. D., No. 438 Adams Ave., Scranton, Pa.
Dorsett, E. B., Mansfield, Pa.
Drake, W. M. C., Volant, Pa.
Eschbach, I. A., Milton, Pa., R. F. D. No. 1.
Fassett, F. H., Meshoppen, Pa.
Funk, Dr. J. H., Boyertown, Pa.
Gooderham, H. M., Patton, Pa., R. F. D.
Herr, Joel A., Millhall, Pa., R. F. D.
Herr, Prof. John D., Division of Economic Zoologist, Harrisburg, Pa.
Hull, Geo. E., Transfer, Pa., R. F. D.
Kahler, A. J., Hughesville, Pa.
Kester, R. P., Grampian, Pa.
Larson, C. W., State College, Pa.
Lighty, L. W., East Berlin, Pa.
Lovejoy, Miss Sara C., State College, Pa.
Mairs, Prof. T. I., State College, Pa.
McCurdy, Clarence C., Hartstown, Pa.
McDowell, M. S., State College, Pa.
Menges, Prof. Franklin, York, Pa.
Northup, Henry W., Dalton, Pa., R. F. D. No. 1.
Orr, Mrs. T. E., Beaver, Pa.
Peachey, J. H., Belleville, Pa.

Fig. 2. Farmer's Institute Lecturers.

Philips, T. J., Atglen, Pa.
Phillips, E. L., New Bethlehem, Pa., R. F. D. No. 2.
Phillipy, Dr. W. T., Carlisle, Pa.
Rich, Chas. H., Woolrich, Pa.
Seeds, Robt. S., Birmingham, Pa.
Stephens, A. Woodward, Hebron, Ohio.
Stewart, Prof. J. P., State College, Pa.
Van Noy, Leon Otice, Troy, Pa., R. F. D. No. 3.
Watts, Prof. R. L., State College, Pa.
Watts, D. H., Kerrmoor, Pa.
Wittman, W. Theo., Allentown, Pa.
Woodman, S. Paul, Rushland, Pa.

PROCEEDINGS OF THE FARMERS' ANNUAL NORMAL INSTITUTE, HELD IN THE COURT HOUSE, BUTLER, PA., MAY 24-27, 1910.

Tuesday, May 24, 1910, 1.30 P. M.

Mr. N. F. Bartley, Euclid, Butler county, Pa., in the Chair.

The CHAIRMAN: Ladies and Gentlemen, Members of the State Board of Agriculture, and Institute Workers of the State of Pennsylvania: I want to thank you for putting me in the position this afternoon of presiding over the first meeting of the Normal Institute, and I want to thank the members of the Board of Agriculture for accepting the invitation last January to come to Butler. I think you made no mistake. We have a nice town here, a town of which I feel proud, and I can say the same of Butler county. This town has a great many facilities. We have good railroad facilities and fine residences, and fine store buildings and fine stores, and well paved streets, and we have good hotel accommodations, as good, I think, as any in the State of Pennsylvania outside the large cities. As I said, I am proud of the city. We have a population here of about 22,000. Some of you are here for the first time. We want to make you just as comfortable as possible. We want you to get acquainted with our citizens and we want to show you a good time and we are going to show you a good time,—I think the best time you ever spent at any Normal Institute in your lives.

Now, in regard to the county, this county, so far as I know, was formed along about in 1800, and prior to that the Indians roamed over this country and they had their war-paths and paths all over this region and the people at that time had to indure great hardships in order to overcome some obstacles that were here. These forests had to be leveled, and the women had a part in this, and they braved these hardships along with the husbands. Butler county has not depended altogther upon its agricultural resources, but we have the coal and we have the lime and we have the oil and the gas that brings us in quite a revenue. Butler county as an agricultural county is not to be compared with Lancaster, Chester, York, and yet at the same time I believe that this county produces more wealth in the oil industries and different other industries than any county in the State of Pennsylvania; and we have a good agricultural county. We produce everything here that you do in other counties and perhaps a little more. We produce buckwheat here, and you don't produce buckwheat in some of your counties. They used to make fun of Butler county, and they told a story about it and about some of their industries that they called the "Soap Mines." Now, I can't just exactly say where these were located, but it is up about Petrolia.

We farm a little different from what you do in other counties. We first farm on the top; then we go down under and we farm below and we farm the coal; then we go down and get the gas, and go down further and get the oil, just like up at Slippery Rock about two years ago when there was a discussion on corn, how much a field of corn would produce to the acre. There were some big stories told about it and a man in the audience got up and said he would like to know how to raise 175 to 200 bushels to the acre. Mr. Detrich said, just turn it up on its edge and farm both sides. That is the way we do; farm it all over.

I thank you for listening to these few feeble remarks I have made, and I now have the honor of introducing to you our President Judge, Hon. James M. Galbraith, who will deliver the address of welcome to you.

ADDRESS OF WELCOME.

By HON. JAMES M. GALBRAITH, *Butler, Pa.*

Mr. Chairman and Members of the Institute: I am very glad on behalf of our town and our county to welcome the Institute to Butler. We have been looking for your coming for some weeks; in fact, there have been two events scheduled for about this time in the month of May, both of which we have been looking forward to with a degree of pleasure and, I suppose, some of our people, with a degree of apprehension, not of this event but of the other. I speak of the coming of Halley's comet which has been scheduled at the same time as the meeting of this Institute. I don't know that any of our people in the apprehension of what may happen from that have made their wills, but I am sure none have because they thought this Institute would come. They knew this was a good class of people to come into our neighborhood and so have been looking forward with pleasure to make your welcome, as our Chairman has said, what it should be and give you a good time.

To illustrate how highly Butler people think of their own town, I will tell you a story: A man of our town had a dream a few years ago. A friend of his had died some weeks before and in his dream his friend returned and he met him face to face and was very much surprised, and he said to him: "Why, I thought you had died some weeks ago and were in Heaven." And so he was, his returned friend explained, "but I want to say to you there is no place like Butler." So you see that we esteem ourselves pretty highly, and we hope that before you go away you will have a feeling, probably not quite as high as that of Butler, but with a good opinion of our town. We are very glad to welcome you here to-day because of what you represent. You represent the oldest calling that man has ever entered into. We read in Sacred Writ that away back in

the beginning, when that beautiful Garden was framed and constructed for the habitation of man, that the Creator placed our first parents in charge of it to care for it. I am willing to admit that he possibly did not make a very good job of it in some respects, possibly because Adam was unfortunate in the choice of a wife,—but however that may be, no matter. He was placed in charge by the Creator who had made him, and that is a compliment not only to the man but to the occupation which was given to him, that of caring for the beautiful garden in which he had been placed, pruning and keeping it and making it not only a source of advantage but also of pleasure as well. Now, from that day down to this I think I may say that the native occupation of the inhabitants of the soil, of the earth, has been the care of the earth and its produce, making it to bloom like the garden; making it to bring forth fruits and flowers and those things both healthful and beautiful. So that you represent all that was involved in that first occupation which God gave to the sons of men; the oldest occupation in point of time of any upon the face of the earth to which men have devoted their lives and energies.

And then we welcome you all because of the class of people you represent. You not only represent the oldest occupation, but you represent a class of people who are without superiors in any other class of people on the face of the earth. It is quite possible that I have a degree of prejudice in favor of the farming class, having been, as I have, fortunately brought up on the farm, I have always had a large degree of sympathy and interest in the farmers and their occupation, and for that reason I believe I am inclined to think that, taking them all in all, they are just a little bit better than any other class of people who follow any other occupation. They represent in large measure, I think, those solid virtues which are necessary in order for the welfare of any community or people. After all, it is upon those virtues largely found and largely preserved in the country homes of our land, it is to those we look for that substantial aid and help in every time of need which comes to every people and to every nation. We look to their substantial virtues and their strong common sense, to their patriotism, to their sense of what is right and depend upon people, most upon that class for the preservation of those things that are at the very foundation of our institution and our prosperity and of our future greatness as it shall grow. We depend more upon that class than any other class in our population.

And then we welcome you because of the greatness of the industry which you represent. I do not know, because I do not have the statistics before me to determine what the value of the products of the farms is in this nation of ours, but I think I can say, without fear of successful contradiction, at least that, the value of the products of our farms in this country far outstrips the products of our mines or any other industry whatever it may be. I think I am right in that. And so, too, we welcome you here to-day as the representatives of that industry, an industry that lies at the foundation of all our other successes and greatness and prosperity too. You are great, your occupation is great not only because of the magnitude of this industry and the magnitude of the value of the annual products of a great industry, but because of our dependence upon it. The

kingdom itself is nourished by the production of the field and whatever is true of the kingdom is true of everyone from the highest to the simplest citizen of the land. After all, we must come back to the land. The important question is always presenting itself, what shall we eat and what shall we be clothed with, and in answer to this importunate question we go back to the soil and its products because it is only with these that man can be fed and clothed and nourished. So that your industry is great because of the very fact that all men are dependent upon it.

Now, you have met here during these coming days to discuss these matters which are nearly related to the questions of the farming industry and all those other subjects that are related to the industry of farming, and they are many. I think we are coming to see more and more that the occupation of the farmer is not so much a matter of routine as once taken to be. We are coming to see more and more that it must be treated in a scientific way, and we are beginning to see that it is not an occupation in which any one man, be he ever so much of an enthusiast, can engage with success; but to farm successfully he must have a more scientific knowledge of those things which enter into it and to the means of securing the best production from the soil, and so you are here this week to discuss those questions in a practical way, in a way that brings them within the reach and understanding of the everyday farmers in this and other communities. There have been persons who have discussed in a theoretical way some of our agricultural matters, questions that are interesting from a theoretical standpoint but yet not wholly practical. Possibly you have all read that story that illustrates that class of articles, of the man who read a very learned paper before some gathering. He had been reading about the dehorning of cattle and so he wrote a very learned article on the practicability of the dehorning of hydraulic rams and, of course, it made a great hit with the farmers in attendance; and this is about the measure of some of the articles that are written or deal with farming in a theoretical way, they are wholly impractical. You are here to-day to discuss these things as practical means, to deal with all these questions of the farming industry in a practical way that will bring them down and reduce them to the farmer's standpoint.

Now, gentlemen, for all these reasons we welcome you to our midst. We hope that you will find your stay here pleasant, so pleasant, that in your future years you will never forget it and our town. If I could do it, I would like to present to you on a silver platter the keys of our city that would unlock to you everything that is good. I don't mean by that that you will find this a wide open town, because we don't pride ourselves as the Mayor of San Francisco, who on the eve of a great pugilistic exhibition that is scheduled to take place there shortly, has sent a statement across this country that San Francisco is not a closed town. I don't mean we are going to open up things in this way. We have tried to keep this a God-fearing, moral community and we hope to do that in large degree, and when we say that we welcome you to our community and all good in it we wish to be understood in the proper sense as welcoming you to those things which are righteous and uplifting. Our Chairman has told you of our schools and industrial

institutions, all of which, if you have the time, will invite and I think interest you in an examination into them and their workings. We have plenty of churches here. We are probably better equipped with schools than almost any little city of our size in the State. They are very modern and in the lead and our teachers are brilliant instructors, and so we might go over all our interests. We have some large industries here and in those things we think you will find this an up-to-date community and one that will interest you and afford you pleasant memories during the years to come.

So I hope then, during these days and hours, you will find your time pleasant, and again in the name of our people of the town and of the people of the county I desire to bid yon a welcome, a hearty welcome to our town and community.

The CHAIRMAN: We will next have the responses to the Address of Welcome. The first response will be made by Mr. Lighty. I have the pleasure of introducing to you Mr. Lighty, one of our Institute Lecturers.

RESPONSE TO ADDRESS OF WELCOME.

By L. W. LIGHTY, *New Berlin, Pa.*

Mr. Chairman, Hon. Judge Galbraith, Ladies and Gentlemen: In behalf of the Department of Farmers' Institutes, I would sincerely thank you for the kindly greeting and pleasant words of welcome so eloquently spoken.

The talk we just listened to was an inspiration as well as a welcome. We realize that we are in a great county. On my first visit to Butler I was shown your fine large school buildings and grounds and I was sure I was among a progressive people. When I went out through your county I found people of a high order of intelligence. Our institutes were well attended by the local people and the part they took was instructive and elevating. We also realize that we are in a county of wonderful resources and wealth, where the wealth of the earth extends deeper than mere plow depth. Out of the bowels of the earth you take that which gives us heat, light and energy. Wonderful wealth was or is stored down among the deep rocks, but once you discover its exact location you seem to pounce upon it like a pack of wolves on its prey. When I visited you a few years ago I found a town with derricks so thick that the rising and setting sun was hidden and I imagined they afforded an effectual windbreak for the country beyond. This shows enterprise; but a few months or years and that stored material will be removed and that will end that chapter. True, other "finds" are located and more chapters are added, but sooner or later you come to the end of that story.

But your real wealth—that which gave you an opportunity yesterday, is the encouragement of to-day and the hope for to-morrow, is in the few surface feet of the soil of Butler county.

Conditions were such in this country that for some years the farmer and his work was practically forgotten. We acted and enacted as though the foundation of wealth and welfare rested on manufacturing, transportation and merchantdizing and our people are just now learning that the manufacturer only changes the shape of things, the transportation people only change the place of things and the merchant only distributes things but that the farmer is the creator of things that did not exist before.

As the consuming population increased and the producing population decreased comparatively and the available soil fertility or productive power of the soil was lessened, something confronted the people at large that was not a theory but an emphatic condition. If I read history aright, that is to say, if I read correctly between the lines, because the history of agriculture was never written, every civilization that this world ever saw grew and prospered as long as agriculture prospered, but as soon as the soil and the tiller thereof was neglected or robbed so as to cripple or demoralize his work, material was manufactured for the historian to write the decline and fall of that civilization. I find this true of Egypt, Asia Minor, Greece and Rome. The trend in this country was heading for the same goal; but several factors altered conditions and we are now trying to relocate on a new basis. Unlike in the older civilizations, not the state, but the individual owns the land in this country and when conditions became unfavorable he could let the soil and its fertility "go to the dogs" to use a familiar expression, and that is what he did in many cases.

WHAT HAS HAPPENED.

Thousands of square miles of former farming land have been abandoned and many more thousands of square miles have been abused and neglected until they produce only the fifth or tenth of what they did some years ago. Five or ten years ago it was about impossible to sell a farm. An active intelligent boy would hardly think of farming, and all roads lead to town and were traveled in but one direction. If the gold output is great or small, the tariff high or low, the trusts "busted" or not when the consumers increased rapidly and the producers and their produce decreased rapidly the inevitable arrived, and if you would learn the manner of its reception just read the dailies, weeklies and monthlies as they are dumped before you by the wagon load. A few wise men forsaw all this trouble and tried to avert it by

Organizing the farmers.

Instructing the farmers.

Providing better educational facilities for farmers children.

Affording by mail delivery, parcels post and otherwise good facilities of communication and transportation.

In all these efforts, the Farmers' Institute movement took the initiative and the lead, except in organization, that being the mother of all rural agitation and education. I will not become reminiscent,

though tempted: In our own State this work was started by a good Chester county farmer, followed by a Centre county farmer, and during the last ten years the work was in the hands of a Lawrence county farmer, who threw his whole soul and energy into the work and developed an institute system second to none in this United States. This institute movement set into motion forces that were not dreamed of several years ago. It not only compelled farmers to think but all other classes of intelligent people.

Who dreamed that the railroad people would spend time and money to help the farmer develop his business? Every big railroad system now appropriates a fund for this purpose. To-day our Normal School authorities are in a ferment about the question of preparing teachers to teach Agriculture in the public schools. Men who are capable along these lines can not nearly fill the present demand. Farmers are called in to assist. Several days ago I was asked to speak to the students of an eastern Normal School, and a more eager and attentive audience I never had. In speaking before a preparatory school, I was surprised at the interest manifested by the boys in the agricultural college and the prospects for the graduates from an agricultural course.

My friends, our work sets the world to thinking seriously about the farmer. It is compelling conditions that will give the farmer a square deal. I am exceedingly proud to be associated with a body of men who have already accomplished great things for the present and future welfare of this great Republic. Let no one imagine that all this came about as in the natural course of events without any one giving the matter much consideration, because such would be a gross mistake. Practically every one connected with this work did a lot of honest, hard and faithful labor. The Director of Institutes, like the general of any army, found that eternal vigilance was the price of success, ever alert, straining every nerve to conquer ignorance and prejudice. With the majority of lecturers, I have been associated with for years and know them to be sterling and conscientious workers for the good of the cause.

But I wish particularly to speak a word about the County Chairmen, who have charge of local matters in the county and without whose aid the work would be one-sided, or unbalanced at best, and possibly a failure in many instances. Two weeks hence these county chairmen will meet with their people and arrange places to hold the next meetings. Later, the places will be visited, committees appointed, programs arranged and the folks interested to make the meeting a success. Days, yes weeks are spent by them in advertising and perfecting arrangements at the different places. When the time comes to hold the meetings, these men come out to the railroad station to meet the lecturers and for the next week or two stay with them looking after their welfare and comfort to the best of their ability—very often themselves suffering discomfort and exposure so the men with them may be well cared for. These men go out and brave the storms and blizzards, drenching rain and driving sleet over roads that baffle description, as well as the traveler. And what compensation tempts these men to do all this and much that I have not enumerated?

No compensation, my friends. Love for their fellow-men, love for country, patriotism and loyalty to duty of the highest citizenship prompts them to do this. Personally, I associated with about

a hundred of these men and I honor and respect them as I do the veterans who defended our country on the battle field, indeed a number of the older ones wear the Grand Army button. A noble, self-sacrificing, conscientious body of men who deserve many-fold the thanks and credit they get from the people whom they serve without renumeration or the thought of pay, only the results of their work in the betterment of humanity. Such is the body of men and women you welcomed and I hope their visit and deliberations for a few days in your city with your excellent people may prove mutually beneficial. Again I thank you for your kindness and many courtesies.

The CHAIRMAN: We will now have another response to the Address of Welcome by Mr. R. P. Kester.

RESPONSE TO ADDRESS OF WELCOME.

By R. P. KESTER, *Grampian, Pa.*

Mr. Chairman, Ladies and Gentlemen: In behalf of the visitors who have come to your beautiful city to spend a few days, we thank you for the words of welcome so aptly spoken. While we recognize this part of the program as something formal and perfunctory, yet we have already seen enough and heard enough to convince us that your words are sincere and we shall take your words of welcome at their face value. Surely you must be a hospitable people to invite two bodies of agricultural people to your city in one year. We appreciate this because it shows you to be a people alive to the importance of agriculture.

Representing, as we do, the several counties of this great Commonwealth, we will, if we can, impress you still more with the importance of this great industry in the Keystone State; a State far-famed for its wealth in minerals and the products of its countless factories, but which we are prone to forget holds a place in the front ranks of agriculture as well. We have, perhaps, been too busy or too modest to advertise ourselves as others have done for themselves, or perhaps we do not fully realize that no other industry in the State produces so much wealth or employs so many people.

While we are pronouncing these mildly boastful words, we want to acknowledge to you that we have not so nearly reached perfection in our art as have those in many of the other great industries of the State. Because, first, there is more to learn; and second, because we have not had the chance in the past to learn the fundamentals of our business. Yet, in saying this, we would have you know that we feel ourselves to be as intelligent in this respect as

those in states more purely agricultural. It has been said by those who know that the Farmers' Institutes in this State, of which this is an epitome, are equal to any held in the Union. That our Department of Agriculture, our State Board, our Granges and other farmers' organizations are laboring as earnestly and effectually as those of any other states.

There are three things that those who have the best interest of agriculture at heart are laboring for: Better rural schools and a school curriculum suited to the needs of rural people; a better understanding of the principles and possibilities of agriculture so that it may become more renumerative and hence more attractive to the young men and women; and third that agriculture receive at the hands of our law-makers a just and proper consideration. That they recognize the fact that the "Infant Industries" have become overbearing towards the parent. You who are city born and bred may query why this work of education should be done at public expense. You will recognize the justice of it when you remember that agriculture lies at the foundation of all other business. That when panic seizes and throttles all other business, agriculture is the giant hand that saves.

In thanking you for this kind greeting, we beg you to keep temptation away from us. Keep your confidence and gold-brick men restrained. Put us to sleep where there is no gas to blow out. Stop your street cars at night and have breakfast at 5.30 in the morning. These requests we make freely because you have greeted us so kindly. In turn, we promise to overlook your short-comings when you visit us in strawberry and spring-chicken time.

SECRETARY CRITCHFIELD: I want to say that the program was sent to the Governor of the Commonwealth at the time the program was sent out, and some days later I wrote the Governor a personal letter on my own behalf and on behalf of Mr. Martin, asking him to attend these sessions, and I have in my satchel a letter from the Governor, that I want to have go on the record, in which he sends you friendly greeting and expresses his regret that he was not able to be here on account of engagements previously made. He sends you greeting and gives expression to his appreciation of the work in which you are engaged.

LETTER OF GOVERNOR STUART.

Commonwealth of Pennsylvania,

Executive Chamber,

Harrisburg, May 18, 1910.

Honorable N. B. Critchfield, Secretary of Agriculture, Harrisburg, Pa.:

My Dear Sir: I have just received your polite invitation to be present at the meeting of the State Board of Agriculture, which will be held in connection with the Farmers' Annual Normal Institute,

at Butler, Pa., May 24-27, but regret to say that previous engagements, which I am unable to defer, covering the period mentioned, will prevent me from attending.

Will you kindly express to the members of the Farmers' Normal Institute my appreciation of the courtesy which has been extended to me, and my regret at my inability to be present.

Yours sincerely,

EDWIN S. STUART.

DIRECTOR MARTIN: Mr. Chairman: I am in receipt of letters from Miss Sara Phillips Thomas, of Wayne, Pa.; Hon. Jason Sexton, of North Wales, Pa., and Mr. Wm. H. Stout, of Pinegrove, Pa., expressing regrets at inability to be present. These letters are directed to be published as part of the proceedings of this meeting, which are as follows:

LETTER OF JASON SEXTON.

Honesdale, Pa., May 18, 1910.

Hon. A. L. Martin, Harrisburg, Pa.:

My Dear Sir and Brother: I am sorry to tell you that I do not expect to meet you and our good institute workers next week at Butler; of course I shall be the loser and not the workers, but it always gives me pleasure to meet with them, many of whom I have been associated with for many years; but all earthly things have an end, so will our connection with the farmers' institute end some day, but the good work will go on all the same. You see the Highway Department has me stationed in this far-off county for the summer, and I do not expect to see home even very often.

Please remember me to all institute workers.

Yours fraternally,

JASON SEXTON.

LETTER OF SARA PHILLIPS THOMAS.

Celtic, White Star Line, May 21, 1910.

Hon. A. L. Martin:

Director of Farmers' Institutes and all those assembled in the Normal Institute at Butler, Pa., I send greetings, and regret that I cannot be with you. I trust that this Institute may be all instruction and enjoyment that you desire it to be.

I am particularly interested in the Ladies' Sessions of the State, and of course in the one you are to hold at Butler, and my earnest desire is that very helpful, practical sessions may be held in every two-days Institute, and that the women of our rural sections may have the instruction and help brought to them along the lines of their interest, just as the men have along the interests of the farm.

The success of these sessions depend largely upon the County Chairmen, and in my opinion, the Chairman of the county should be on the outlook for one, at least, thoroughly, capable, enthusiastic woman who will make a success of such session, and he should influence a program so that it will be practical and not ethical.

Domestic science and economy, household helps, community work, law and finance, as women should know them, and sanitation are a few of the subjects that suggest themselves as being worth presenting.

Comfortable, definite arrangements on the part of County Chairmen will help to keep and induce the desirable women to take up this work as lecturers.

My thoughts and interest are with you; but I am going to take a part in even a larger work early in June in Glasgow, Scotland, when I attend the World's Convention of the Woman's Christian Temperance Union, and my part there is the department that has to do with the education of the children. We must remember the children of to-day are the men and women of to-morrow and when we form the sentiment of the children, we are determining the opinion of the men and women of the future, and I hope the day will soon come when all the forces for the advancement of mankind may join hands in an active campaign for the uplift of humanity.

Very cordially yours,

SARA PHILLIPS THOMAS.

LETTER OF W. H. STOUT.

Pine Grove, Pa., May 21, 1910.

Hon. A. L. Martin, Butler, Pa.:

My Dear Mr. Martin: Until to-day I was undecided about joining you and the Brethren in the annual round-up. It would afford me pleasure to greet the members of the Board and Institute workers; however, with the various things requiring attention here must forego the anticipated pleasure. The weather, as you are aware, this spring was unusual, beginning warm early and cold and rainy following until within a few days my principal care are the bees, and they practically were starving in the midst of abundant bloom, so for the first time was obliged to feed some to bring them

through until clover blooms. Crops, notwithstanding the peculiar season, are promising and one of the surprising crops is clover, after the protracted drought last summer.

Mr. Shoener, my successor, expects to join you so you will have a representative from this county. Trust you will have a rousing good meeting.

I am,

Sincerely yours,

W. H. STOUT.

The CHAIRMAN: Anything further to be brought before the meeting at this time? If not we will proceed with the program. The first subject is, "The Farmer a Manufacturer," by Prof. Franklin Menges, of York, Pa.

DEPUTY SECRETARY MARTIN: Before the Professor takes up that period, I would like to say to all who are present, that we have a collection of bulletins prepared by the Department relating to two or three separate, distinct lines of farm work carried on in Pennsylvania; poultry, potato growing and domestic science, the part in which our ladies are performing such excellent work for Pennsylvania. These bulletins are over there on the window ledge at the left for free distribution. Any person desiring them can help themselves.

We have tablets and pencils which will now be distributed. My friends, there will be during the next four days' meeting interesting questions submitted and lessons imparted of vast importance to agriculture. We distribute these tablets and pencils in order that you may make note of the lessons brought out here. Have them before you at your farms during the year and we feel sure in saying that you will make use, as you have done in the past, of these note books. Make them a part of your farm work, thereby developing better farm operations. The object of these meetings is to help the tillers of the soil.

SECRETARY CRITCHFIELD: Mr. Chairman, I notice in your roll calls that you had a place for the County Institute Managers; and then you had a place for your Institute Lecturers. Now, there are a few others of us here who would like to appear on the record; indeed, I would like to have my name appear as being present at this meeting and I don't care if you put it under the head of supernumerary.

DEPUTY SECRETARY MARTIN: That reminds me Mr. Secretary, that this meeting is open to representatives of all agricultural societies of the State, all Granges and other kindred forms of organization. Now, if there are delegates or representatives of any of these organizations of farmers here, who come to take part in this Institute, we wish you would hold up your hands and give us your names in order that you may get on the record. From time to time we invite you to take part in the discussions in order to develop the very best thoughts that can be done for the success of

this great work, hence, we ask our secretary to enroll all such persons who are delegates or representatives from their counties, to present their credentials in order that they may be recorded.

The CHAIRMAN: I have now the pleasure of introducing to you Prof. Franklin Menges, of York, Pa., who will speak to you on the subject of "The Farmer a Manufacturer."

Prof. Menges address is as follows:

THE FARMER A MANUFACTURER.

By PROF. FRANKLIN MENGES, *York, Pa.*

I might as well begin this discussion by stating what I do not mean by making the farmer a manufacturer. I do not mean that he shall go back to the early conditions in which his grandfather lived. I do not mean that he shall use for lighting his house the ancient tallow dip instead of the kerosene, the gasolene, denatured alcohol, acetylene or electric light burners of the present day. I do not mean that he shall warm his house and cook his meals in the log filled fire place of the ancients, instead of with the modern hot air, hot water or steam heating apparatus and the gasolene, denatured alcohol, and gas ranges of to-day. I do not mean that he shall give up his high pressure water system furnishing him water for his entire plant as well as better fire protection than most of the small towns have, and go back to the old oaken bucket. I do not mean that he shall change his factory-made clothing of the most delicate weaves and the latest cut to the homespun and misfits of his not distant ancestor. I do not want him to return to and depend entirely upon the home grown viands of his grandmother, but I would rather his table be graced with the delicacies of both hemispheres. In short, I mean that the farmer's manufacturing plant shall be equipped with all the labor-saving machinery of the day. I recognize the fact that by introducing the farmer into the industrial system, or rather into the manufacturing world where labor is applied with the greatest economy, which necessitates the division of labor, and also the introduction of varied and delicate machinery, requiring trained mechanics to handle, and which economy leads to new discoveries and consequent invention of still more intricate machinery and a demand for large capital to conduct these ever enlarging enterprises; I say I recognize that I am enlarging his sphere immensely and introducing him into a domain for which he has little adaptation, moreover I do not mean to do away with our present industrial system and hand all over to the farmer and make him the all and in all to all the world, but I mean in these vast activities in which up to this time he has only been the producer of the necessities of life and in many instances only the raw material which he has handed over to a middle man to sell for him and the middleman has sold to the manufacturer and in many instances the manufacturer used another middleman to dispose of

the manufactured goods until the whole system has so permeated our national life that we have a business government, so intricate and vast in all its ramifications that it sets our little brains whizzing and buzzing and we give up in despair and go back to production again.

I want the farmer to do some of this manufacturing, especially that pertaining to his products, both for his own benefit and for the benefit of the consumer, because, this handing over the sale and manufacturing of the farmer's produce to a middleman and manufacturer has for some, to me, inexplicable reason centered all manufacturing in cities and towns and has deprived the farmer of labor and large quantities of waste material. This deprivation of the farmer of his labor and the enormous demands of profit by so called business and manufacture, enabling both to pay larger wages than the farmer, has made the farmer the servant of the entire system, and may finally result in a reduction of consumption of the farmer's products, as has already been done by an anti-meat consuming organization started in our national capital, and thus deprive the laboring man's dinner pail eventually of the viands that grace the middleman's and the manufacturer's tables, and in this way this system puts the farmer, the producer, and the consumer at the mercy of the middleman and the manufacturer. It vitiates the farmer's efficiency, and makes him a derelict of his God-given duty, that of feeding mankind, and mankind at the present time lives largely on manufactured food.

Take the crops he raises on his farm and, with few exceptions, they have to be manufactured before man now uses them as food. The farmer does little or none of this but sells to a second party who may ship it to the manufacturer, who manufactures it, ships it to the consumer or perhaps to the very farmer who produced the article, with the added cost of two, three or four handlings and the commissions of as many intermediaries, costing probably more than it cost to produce the original article. The staple crops, such as wheat and corn, except in its unripe condition, must be manufactured before they are in condition for consumption by man. From one-half to two-thirds of the corn crop and from fifty to sixty per cent. of the wheat crop is inedible by man. The same thing is well nigh entirely true of the grasses and clovers from which he makes his hay, and in order to make these available for human food he must utilize the animal, especially the ruminant, the digestive machinery of which is so constructed that it can digest the cruder celluloses and convert them into human foods through a vital machinery of the highest efficiency. I said a machinery of the highest efficiency. He will therefore use a cow that will convert approximately the same amount of food into 9,000 pounds of milk instead of a cow that will make only 3,000 pounds of available human food out of these inedible, by man, products of the soil.

Here is the beginning of his manufacturing operation. He does all the risky, expensive, laborious and delicate work in the process of production, and why should he not do the manufacturing that is necessary and wherever it is possible to do this, instead of handing it over to be manufactured by one man, peddled by another and consumed by a third and let each one of these intermediaries have as large or even a larger profit out of the operation than he has and then call that the business end of the transaction.

In order to show that what I am saying is practical, I have made a little investigation in the city of York. I have collected some statistics from a number of our cattle dealers. Lewis Ahrens & Co., one of the largest dealers in the city, gave me the following figures from the record of their transactions during the year 1909: They sold for slaughtering to the butchers of York during that year 2,764 cattle, 1,625 hogs, gathered largely from York county and Maryland, and 417 shipped in from the West, making a total of 2,042 hogs sold by one dealer. W. A. Little & Co., another firm, gave me approximately the same number of steers and hogs sold to the butchers in York. Besides this, Mr. Ahrens sold over 2,700 steers as feeders to the farmers in York county, many of which were afterwards bought by York butchers and slaughtered there and at least some of the beef consumed in York, so that it is not by any means an exaggeration to say that from 4,000 to 5,000 steers and from 4,000 to 6,000 hogs are consumed every year in the city of York. Very few of these steers and only about half of the hogs are raised in York county.

FARMS FOR RAISING HOGS AND STEERS.

There are easily two hundred 100-acre farms within six or seven miles around York. Enough of that crude cellulose inedible by man can be produced on every one of these farms to raise and prepare for market 300 hogs or 24 steers every year. But suppose we take only 20 of these 100-acre farms and we will say that each one of the 20 farmers raises and puts into marketable condition 300 hogs every year. But we do not want this farmer only to raise the hogs but to do the manufacturing also. He slaughters and prepares for market and markets them one a day every working day in the year and he sells that pork directly to the consumers. He can share profits with the consumer and at the same time undersell the men to whom he used to sell his products, men with their millions behind them. But let us take 100 of the remaining 180 farmers in the vicinity of York and have them raise and prepare 24 steers each for market and do the manufacturing and marketing of 2 steers a month or a total of 200 steers a month or approximately 6 steers a day for the consumers of the city of York. These men can compete with any combination however strong because they have eliminated the cost of long distance transportation both of steer and the manufactured product and the charges of intermediaries. They raise on their farms what is needed for feeding these steers, for they stop plowing down green crops when they are in the most digestible and efficient feeding condition for animals and feed them to their animals and stop buying concentrated feeds and paying enormous profits and transportation for these, and what is still more they use the excrement of these animals when in its highest efficiency as fertility and keep up the productiveness of their soil. I do not mean to say that he will not need to add some one or two perhaps of the ingredients of a fertilizer to some crops they raise, but this will be a minor consideration. They are working along the line of a permanent agriculture. The by-products of their manufacturing plant they convert into poultry, eggs, beef or pork.

OTHER MANUFACTURERS.

Not only is this true of the manufacturer in the limited way I have here indicated in the local production of beef and pork, but all other food stuffs are so high already that they will not stand the added cost of transporting the raw material long distances to be manufactured into edible forms and then reshipped to the consumer in the immediate vicinity where they were grown and where they might have been manufactured as well or better for no more cost than at the distant center, without the cost of transportation. This the co-operative societies of the West have been recognizing and they have been working along the lines of manufacturing the raw materials of our food stuffs in the vicinities where they are grown. Certainly the natural conclusions is that sections should raise the crops for which their soil, climate, market and labor conditions are best adapted.

POWER.

This naturally brings us to the question of power. The manufacturer must have cheap power to run his factory and if the farmer is to become a manufacturer he must have cheap power for it is he who *must reduce the high cost of living.* It is my firm conviction that one of the most paramount duties of the State and the Nation is to inaugurate a series of investigations and experiments with the end in view of conserving, developing and utilizing for power and where needed for irrigation, the energy that now flows down our rivers and streams undeveloped and unused. But there is another source of power which is grown and available on every farm in the land in the shape of indigestible cellulose, both by man and animals, that has not been used by the farmer. Fifty per cent. of corn stover and little if any of the cellulose of the corn cob can be digested by our animals and we know that tons and tons of these substances are produced on all our farms. We have now discovered that these can be converted into power by making them into alcohol.

INDUSTRIAL ALCOHOL FROM SAW DUST.

At a meeting of the Canadian Section of the English Society of Chemical Industries, held at Montreal, Canada, October 22, 1909, Prof. R. F. Ruttan, M. D., read a paper on Ethyl Alcohol from Saw Dust and other Wood Waste, published in the Journal of the Society of Chemical Industries of England, December 31, 1909, pp. 1290-94, also in the Scientific Supplement, April 16, 1910, in which he shows that the Classen process for the manufacture of alcohol from the waste material of wood has been so modified and improved by two chemical engineers, Messrs. Malcolm F. Ewen and G. H. Tomlinson that it now has become a financial success. These gentlemen conducting their experiments at Chicago Heights, near the city of Chicago, with a plant erected by the Wood Waste Products Company, now the Standard Alcohol Company, under their direction and by the use of their patents. It is known that the raw material out of which denatured alcohol is made at the present time costs from 20 to 24 cents a gallon. These men have shown that from the wood waste of large saw mills and wood manufacturing

plants where saw dust and other waste is often a nuisance they can make from a ton of this waste from twenty to thirty gallons of alcohol at from two to two and one-half cents a gallon for raw material and a number of by-products such as turpentine, acetic acid and have sixty per cent. of the saw dust remaining.

In order to be certain that I was not misled, I wrote to the Standard Alcohol Company, 505 Rookery Building, Chicago, and asked them a number of questions to which I received the following reply:

"Standard Alcohol Company,
505 Rookery Building,
Chicago, Ill., May 10, 1910.

Dr. Franklin Menges, York, Pa.:

Dear Sir: Replying to yours of May 7th, the writer is not prepared to answer the chemical questions that you ask. Our chemist is at present at Georgetown, S. C., where we are erecting a large plant, but we are sending you to-day copy of the Scientific American Supplement, last issue, which contains a two page article by Dr. Ruttan, which may be of service to you.

In answer to your question as to why we do not get more than twenty gallons of alcohol per ton, would state that we have obtained thirty and thirty-two gallons, but as it is a commercial proposition we do not wish to overstate or over estimate the yield; so have accepted twenty gallons for the present at least as the basis of operation. When our plant is in full operation we will undoubtedly learn more about yields.

We have not tried any of the other cellulose material commercially, but have experimented in the laboratory with those you name, as well as peat and cotton, and see no reason why we should not get the same results as we get from the wood cellulose.

Nothing has been done anywhere in reference to promotion of the business excepting in the United States. Other countries will follow we expect, by this Summer, after we have our plant in Georgetown, S. C., in operation. We expect this will be started in a couple of weeks.

We have many inquiries from abroad from people who wish to become interested financially but have held them off pending the operation of our plant, so that they can see exactly what the operation is before they go into it. * * * * * *

Yours very truly,
STANDARD ALCOHOL COMPANY,
JOHN M. EWEN,
President."

Another source of power, and one in which the State of Pennsylvania has advantages over any State in the Union, is that from producer gas. This gas can be manufactured at the mouth of the coal mine, conducted from there in pipe lines to the consumer or converted into electric power and furnished in this shape for the use of the manufacturer. Any one desiring any further information about this source of power development will find a very interesting discussion in Bulletin No. 416, U. S. Geological Survey. It will be noticed that this power is made on the farm or nearby.

THE CO-OPERATIVE CREDIT COMPANIES.

The question naturally arises, where shall the average farmer of to-day get the money to introduce all these new ideas and how will the young farmer of the future be able to begin operations when he will be obliged, in order to compete with his neighbor, to introduce one or the other of these manufacturing plants or become a partner in one to enjoy the privileges it confers, where will he get the money? These and similar questions, when land values increased in Germany, confronted the German farmer and had to be solved. This condition brought into existence "The German Co-operative Credit Companies." These companies are formed by a number of farmers who get together, take a careful inventory of the property of each and determine how much credit each is entitled to and then they assume joint responsibility for the amount. They get a charter and elect officers and they are ready to begin business. When the members of the organization wish to avail themselves of this credit to go into a joint enterprise they go to the cashier, make themselves responsible for the amount of credit each is entitled to, when the cashier issues them a note or bond which they offer for sale in the market. These long time notes or bonds, ranging from twenty to forty years, have proven so secure an investment that the demand is greater than the supply. The rate of interest is from three to four per cent. or rather it ranges very closely with the profits of the farming business. When a member of the company has money to spare he deposits it with the cashier and receives a certificate of deposit which entitles him to a rate of interest equal to that which he would be obliged to pay were he borrowing money, and in this way the company becomes a Savings and a Loan Association. When a member buys an addition to his farm, his credit is expanded to a prescribed proportion of the value of the land bought, and if he demands it the credit of the company is given him in the form of a bond which he is allowed to sell. This credit is usually on a forty-year term. A small annual payment, sufficient to pay the debt in forty years, accompanying the interest, is demanded. Some of these Credit Companies are over a century old and have flourished throughout this interval of time, and have been the agencies through which seven-eighths of the agricultural land of Germany has been retained by or acquired by the men who till it, a condition that does not exist in any country in the world so far as I can discover. If in Germany, where land values are high and taxes enormous, these companies can do such service what would not be the possibility of such an organization in America? It will raise the farmer at once into the domain of business. He will at once see and feel the effects of legislation. Transportation in all its phases by ocean steamer, through internal waterways, by steam and electricity, and even through the air, will appeal to him and enlist his interest. Making the farmer a manufacturer will mitigate city congestion and at least some of the evils of congestion will disappear. It will bring the producer and consumer closer together and, as already indicated, it will reduce to the minimum the cost of transportation. But what is still of more value, the formation of a co-operative credit association will create a community of financial interests and it cannot help but make a closer social union of the farmers in such communities.

THE TRAINING OF THE FARMER.

But the next question that is in the mind of everyone is, How shall the farmer get the training for the business transactions and the manufacturing involved in such a scheme? This is the crux of the situation and one that will have to be met and answered by our agricultural educators. First, by the lecturers at Farmers' Institutes because it is they, though I am sorry to say in a limited way, that bring the college to the average farmer. But this is only the merest beginning, and the next agents are the Departments of Agriculture of both State and Nation; but over and above all is the Experiment Station and the Agricultural College. Up to this time the Experiment Stations have confined their energies largely to the production of two blades of grass where one grew before, not that it was the desire to do this by those who were managing the work, but very often largely on account of the indifference of the farmer and the agricultural interests of the State to supply funds for the work, and where funds were available men could not be gotten to give the kind of instruction needed. We know that not by any means all the waste on the farm is in production, but that sometimes more waste occurs in the marketing and utilization of the products of the soil. The investigations at the Experiment Station should therefore include agricultural, manufacturing and the utilization on the farm of all waste products in the best way possible. This is an enormous field and a simple enumeration of all it involves is impossible. But the Agricultural College must also train the teachers to begin this kind of vocational instruction in our public schools. She must teach methods to increase production, methods to prevent the waste that is going on on the farm, methods of agricultural manufacturing, methods of utilizing the various kinds of power at the command of the farmer, methods for the best utilization of the various soils of a community, methods of producing and growing more efficient animals on the farm. She should have a Department of Economics which should be so directed that it would cover the field of transportation, manufacturing and market, etc., as these relate to the farmer and the workman of these various communities, a Department of Sociology, a Department of Agricultural Architecture, a Department of Agricultural Sanitation, but over and above all, a department for raising better men and women on the farm.

Let the Normal Institute resolve to begin a movement to so equip our Agricultural College and Experiment Station with facilities for instructing students in the elements of these various activities, whom she may send forth from her halls and fields to impart these elements of vocational training in our public schools so that the future farmer will be the master he should be instead of the servant he otherwise will be.

The CHAIRMAN: I notice a foot note here that after each topic fifteen minutes can be used up in discussion. Are there any questions or discussions on this topic?

MISS BAKER: I came back from the Old Dominion State (Virginia) within the last twenty-four hours with the feeling that somehow or other my people in the State of Pennsylvania must get in

touch and feel the revival of agriculture in the South. We must study their methods. We must stop teaching old dogs new tricks and begin to go out into the surroundings that every boy and girl who lives in the country lives in and teach the boys and girls agriculture. I have been staying in the home of what they call in the State of Virginia, a collaborator, acting under a State agent who is appointed by the Agriculture Department at Washington. Virginia has appropriated through its Legislature the first money that any State in the South has given to that work. I have met personally the boys who belong to the corn club. I have met personally the men who belong to the grass club. I know what the Governor of Virginia is doing offering prizes to boys; what the State Agricultural Association of Virginia is doing in the way of offering prizes for the best ten ears and for the best yield. I have been so filled with enthusiasm by the actual doings and teaching of agriculture on the farms that I feel called to tell you of it, and I regret that we have but one college in our State of Pennsylvania that has the kind of a patron that Virginia is producing. We have that man in Eli M. Rapp, of Berks county. He is doing the work and if you make a pilgrimage to his county the last week in October you will see what teaching agriculture means if we begin to do it now.

MR. J. ALDUS HERR: Mr. Chairman, in reference to the topic on which Prof. Menges just spoke, in manufacturing, I would say that in Lancaster county we manufacture or rather consume all our hay, all our corn, we consume more wheat than we produce, use more flour than we produce and manufacture, and manufacture a good portion of our tobacco into cigars and feed many thousand cattle and hogs which supply some Lancaster markets, the others being shipped to Philadelphia and New York. Quite a number of weeks in Lancaster there are being sold at the Lancaster Stockyards more than 250 carloads of beef cattle for distribution over the county and adjoining counties; many of them are stable-fed in the county, which makes a market for our corn, our grain and our fodder, besides the many tons of by-products that are brought into the county and fed outside of what we produce. This, I think, has been the very basis of the production of our county, by keeping it up, by feeding and even buying more than we produce. We are manufacturers as well as producers.

PROF. MENGES: In regard to what Mr. Herr has said, I want to say that a large number of York county farmers go to the Lancaster markets to buy feeders. You know that the Pennsylvania Railroad has given a privilege to Lancaster that very few cities enjoy. It is a stopping place for unloading cattle and watering them and any cattle that are sold in Lancaster can be sold there for a little less money than they can be sold even in the city, and therefore Lancaster has an advantage that very few places have because of that. And I say that a large number of our farmers go over there and buy their cattle there, bring them to York county, fatten them and then sell them there to our butchers or ship them away to the cities.

Another thing in regard to the manufacturing as I have outlined it, which goes a little farther, I think, than most of us usually go in regard to this manufacturing of fertility. I know the farmers of York county—I know Mr. Lighty can probably say amen to a lot of this—I know the fellows that are cattle feeders have their farms up in fertility that is well nigh perfection and they retain them there, just exactly as Mr. Herr has indicated they do in Lancaster county.

The CHAIRMAN: Any others who have anything to say on the matter?

PROF. MENGES: Mr. Chairman, I would like to hear from some of the Dairymen.

The CHAIRMAN: Are there any dairymen here who have anything to say on this matter? I guess if you want a dairyman it would be a good thing to call up Seeds.

MR. J. ALDUS HERR: Mr. Chairman, we claim to be quite a dairy county. I recollect twenty-five years ago when a cow sale in Lancaster was an unusual thing. Now you take a Lancaster paper and you will find eight or ten cow sales over the county in that many days. I noticed in last evening's paper that there would be five sales within a radius of five miles of Lancaster this week; anywhere from thirty to eighty head. That is going on continually. I have seen as much as twenty tons of milk delivered on a Monday at the Lancaster Caramel Factory. Somebody must have a sweet tooth. Quite a good deal of milk is shipped to Philadelphia, but most of it produced is manufactured and quite a good deal is manufactured right in the City of Lancaster and adjoining towns. We claim to be a producing and manufacturing county in the agricultural line and also growing very rapidly to be a dairy county and unless some of our neighboring counties get busy we will soon catch them. This is because we feed well. You can't stop a good Lancaster County Dutchman. He will fed his horse whether he does anything else or not and I think this is quite the basis of our agricultural wealth. We try to take care of our soil by feeding.

DR. CONARD: I don't know of any better object lessons that illustrate, demonstrate and emphasize the points brought out by Prof. Menges as to manufacturing on the farm than were brought here in some of our counties by Mr. J. T. McDaniels, of Delhi, N. Y. You remember he was with us in institute work. Unfortunately, Mr. McDaniels was stored full of information but did not have the knack of giving it away very freely. But he conducts, properly speaking, a manufacturing farm. I had the pleasure of visiting his place and I think some of you have seen it, but for the benefit of those who have not I will take a minute or two to describe or explain how he applies manufacturing on the farm.

He has about, approximately, 300 acres of hilly, rough land, largely grass land. He produces some corn which he makes into silage. He keeps 100 cows. He makes his produce into butter and ships into New York. He is 300 miles to New York. It is

plenty near enough to ship by express. These cows are kept in one large stable and the milk is carried to one side of the stable and poured through a partition into the creamery and the separator is running at the time. He uses the old fashioned separator which has the power of lifting the skim milk ten or twelve inches. Taken into the separator the skim milk is carried up an elevation and goes direct into the cows trough and so he manufactures the whole thing into butter as fast as it goes. He has a large poultry plant and keeps anywheres from 1,000 to 6,500 hens which produce enough eggs to go with the butter which he sells, so that he supplies families with the butter and eggs. That gives him a hold on that trade entirely. Then he has a large maple grove from which he makes a good deal of maple sugar. He has also apple orchards and manufactures cider and apple butter. He manufactures some of this cider into jelly known as cider jelly. So that gives him quite a line of necessities which he ships to New York by express in packages suitable for each individual customer. For instance, he has a customer who wants four pounds of butter, some eggs and a little apple butter. He makes a little box and ships it right to that kitchen, right into that kitchen and the check comes back. He never has to go for it. No expense at all. The express is a small matter. That box he ships in is manufactured by a small saw mill run by water power which he runs. He saws the wood from his own woods, makes the boxes right at his own place, just paying out money for nails and labor. He has also an electric light plant run by the same stream. The electric light plant is in the corner of this mill and the whole farm house, barn, creamery, mill and three tenant houses are all well and thoroughly lighted and when he gets up in the morning he can turn a wheel by which he can regulate the water over the wheel and turn on the power and light up the whole place and if he prefers he can keep it running all night. The only cost is the wire and output on the machinery and the lamps and his electric light costs him nothing. He even manufactures his ground hogs and wood chucks into chicken feed. He told me he gave his men so much a piece for killing them. One man came in with nineteen in a wheel barrow. He puts them into a barrel, steams them up and feeds them to his chickens. Everything is turned to account. The result is, he bought that with very little money. He has it elegantly equipped, the best equipped farm I was ever on. He has put three daughters through college and when I was there the fourth one was going and we seldom get into as good and fine a home, and there seemed no hurry, no bustle or friction there. The business was going on as nice as it could be wished.

I consider that a manufacturing farm. That was Mr. J. T. McDaniel's, of Delhi, N. Y.; six miles from Delhi, N. Y., and pretty good roads.

MR. LIGHTY: I was very much pleased with the recommendations of Dr. Menges' paper, especially when he recommends that the Institute Lecturers work along the line of sympathy and teaching that underlying business principle, selling for their profits. Now, I believe there is where the farmers are lacking more than in any other one thing. It is true that that example just cited by Dr. Conard is very inspiring; but where is there any other man that

has done what J. T. McDaniels has done. He is the one man in all these states round about that has accomplished that. It is the knack of business ability. It is the lack of ability of the farmer out there on the old farm to go into the city or town and sell his goods that he produces that causes that securing of middle men to act between the consumer and the producer and is in a large measure accountable for the high prices spoken by Prof. Menges. I believe the Farmers' Institute Workers can do a good deal in aiding the farmers in the matter of a business education; a little can be done in the public schools; much can be done in agricultural colleges to teach the farmers, to instruct the farmers along the lines of business principles, so that they can go out and sell the goods they produce. I believe that is a very important work that is to be taken up at this time.

MR. SEEDS: Talk about the Institute Lecturers teaching the farmers! I have been telling the farmer everything I knew and a little bit more for ten years and doing my best and I want to just endorse what my brother has said who sat down there: What one man can do, another man cannot do. He may come close to it, but it is just as true as that every man that goes to the city cannot be successful. If you start to make the farmer into a manufacturer you will spoil him for the farm. We ought to feed everything on the farm we can possibly feed there. When the political lecturer out West was arguing with the farmers on the prohibition question he said, "What will you do with your corn that the distillers use, millions of bushels of every year, if you vote out the distillery and whiskey?" And old farmer got up in the back part of the house and said, "We will raise more hogs and less hell." I acknowledge we want to raise more hogs, but when you make a butcher out of the farmer you spoil him as a farmer. While Mr. McDaniels has done everything he claims, yet a farmer may raise wheat, but when he goes to grind it into flour he will make a failure. You may as well say he can make bread. Now, my Brother Menges claims that you have the farmers in York who will butcher a hog every day and take it into York. What kind of a county would you have of York if every farmer would do that. You could smell York county as far as you could see it.

The railroads are interested in agriculture, and the day is here now when the farmer ought to get everything out of this thing. The women in the cities are talking agriculture. Only a short time ago two ladies were passing a farm house where there were some calves playing in the barnyard, and one of the ladies said, "Look at the nice little cows over there." The other lady says, "They are not cows; they are bullies." Everybody is talking agriculture and the farmer ought to talk agriculture, but I tell you, you can't make a butcher out of the farmer or a miller. If you do, you spoil the farmer.

MR. JOEL HERR: I just want to emphasize what Brother Seeds has said: Instead of one farmer trying to cover the whole field by producing everything he can on the farm and manufacturing everything he produces, he better bend his energy to one particular line of produce on that farm and get all out of it he can. Learn that

well. Do the very best he can to produce the best in his line that can be produced so that he advertises himself and his business and custom and trade seeks him and he gets the highest prices because he has the best article. Let him learn how to raise the best and how best to present it to the market.

PROF. MENGES: If I recollect correctly, I said in that paper that there are at least two hundred 100-acre farms around York, and out of the two hundred, instead of taking one hundred and eighty as Brother Seeds said, I took only twenty so that you could hardly smell them up here. Now, if we can make twenty specialists out of every two hundred of these farmers, I believe it will be solving this agricultural question, this high cost of living and all that kind of thing, and that is what I am trying to solve out. I want to get a little money that that other fellow gets, and I want to have a little of that money that the other fellow gets too much. I am the consumer and producer both, and I would like to get a little closer to that producer than I can at the present time. He is a little too far away from me. I don't like it a bit. I did not say one hundred and eighty. I said only twenty. That is easy. They don't make much racket in the world.

MR. SEEDS: I ask Brother Menges if he has farmers who would sell meat cheaper to the people than the butcher would? Would you do it?

PROF. MENGES: Yes I would. I want to tell you that I would.

SECRETARY CRITCHFIELD: But you do not?

PROF. MENGES: I do not now because I do not make it.

SECRETARY CRITCHFIELD: But if you made it, would you?

PROF. MENGES: This is an altruistic idea here. It is not all dollars and cents. No sir, my friends, this question is a question between man and man, to do honestly by your fellow man. That is the thing that I believe we must bring out at these institutes as much as anything else.

DEPUTY SECRETARY MARTIN: I like the way this discussion is progressing. My fellow-farmers, there is no other question that we can discuss with greater profit to the farmer and the great consuming public than that one problem. How shall we reach the consumer with the least loss in reaching that consumer. I would like to hear the expression from the best thinkers on that matter. Professor Menges argues that the farmer who produces the crop or grows the animal should, by some means, reach the consumer. Now discuss this question fully. We have a half hour more yet to discuss it, the one that has passed all over the country. You are just coming to a very vital point.

SECRETARY CRITCHFIELD: I was going to say, the best way is to let the consumer know you want to reach him. I have never had any trouble. For years I was manufacturing butter in Som-

erset county when we were turning our attention principally to the butter business and that butter was sold in Johnstown. Sold first of all, to special customers and in a little while they said you don't have to do this; just send your butter to a certain grocer; and I got a special price and that grocer got a special price for handling it. All I found was necessary was to let the consumers know that I wanted to reach them. And so about the pork business. My friend Seeds says if you are going to make a butcher out of the farmer you will spoil the farmer. I never sold a hog in my life and I never dressed a hog and sold it. We manufactured them into sausage and we sold the sausage and then we put the hams and shoulders into the smoke house and cured them, first having salted them.

MR. SEEDS: How often did you do that, every week?

SECRETARY CRITCHFIELD: Oh, no. I am talking about another method. I want to say that I can shoot a hog as well as I ever shot them and I say there is no butcher in Butler or anywhere else that can stick a hog better than I can and I can sell him and get the pork right to the market and I don't have any trouble at all. All I have to do is let the public know I want to reach them and they are likely to come right to the farm, if you will only let them know that you are looking for them. That has been my experience.

MR. SEEDS: Did you sell your butter cheaper to the consumer when you sold direct to him than anybody else?

SECRETARY CRITCHFIELD: No; I sold it for more.

MR. KESTER: I am glad that Prof. Menges has reached this important question, the first that will come before these sessions. While he was reading his paper, I wondered whether we would not notice, if we thought for a moment, when we traveled over Pennsylvania that the poorest farms and the poorest farmers are those who sell their raw material in the crudest form. Are they not poor in profit, in practice and fertility? A little incident they tell of my great grandfather who was one of the early settlers of Clearfield county and, by the way, a man who succeeded in leaving a farm to each of his four sons and money to each of his four daughters. He was indeed a home manufacturer, and after years of endeavor said that the best he could do his store bill would run $15.00 a year. He was a manufacturer within himself and he prospered. Now we cannot do as he did. They made their own shoes and clothing. It is only an illustration. But that principle of increasing the fertility, reducing cost, of increasing the profits, follows the discussion of this question or the practice of it. It is something we got to study and think about; practice first and then recommend to others. In considering this thing of intensively following one plan, the specialist of one crop, we have to look at the fellows of the West who raised corn, corn until their land became poor and in the Northwest where they raised wheat and wheat and

we in Pennsylvania raised hay and hay and sold it until the land became poor. This is a question that I am glad is so interesting to the members of this institute.

MR. SHUEY: I know in our county you will not spoil a man when you make a butcher out of him as Mr. Seeds says. Our farmers go to Lebanon and have their customers there and they have butchered from Fall to Spring and take the eggs there every week, sausage and whatever the people want and get more than any butcher will get, because you have a good article, and what we get from them we know is all right. And then the hams and shoulders and sausage in summer time he takes along with the butter and eggs and he always gets the highest prices. Now why cannot more of the farmers get into that line and be manufacturers as well as producers. They raise poultry and truck and supply their customers and they get them what they want and they try to supply them the year round with what they want.

MR. CAMPBELL: There is one question the discussion is getting away from. I want to emphasize that; and that is in the employment of the factory the necessity of paying attention to the economy of production. In our farm which we run largely as a factory there is only one way, and that is to study the practice of economy in production, while we do endeavor to produce an article that will bring a high price, when the higher we get that up in the scale the less complication we have. Some of your big factories in Butler don't figure on big profits. They cut prices for the goods and they do figure on producing those goods in an economical manner for the lowest cent. I tell you we have come to the time for economy in production. Very much we are drifting away from one of the most important problems of the farm to-day.

MR. PERHAM: I heartily agree with Prof. Menges that every farmer should be a manufacturer; but every farmer should not try to manufacture along the various lines of agriculture. That man up in York State perhaps has had exceptional ability to make a success along all those lines. But if I was a wheat grower I believe I could grind my wheat and it would not spoil me as a farmer, and if a hog raiser I can find a market for the hogs and it would not spoil me. I have been a dairyman all my life and we find a market every morning, and yet it did not spoil me. Every day the product goes from that dairy and the income comes in in cash every Monday morning and I find this is a successful way of conducting the farm, but if I bred race horses I think I would neglect my dairying and perhaps the whole business would be a failure. But I have concentrated my whole action and energy upon the dairy and met, to some extent, with success. The men who are dairymen entirely and feed the feed they raise on the farm, we can mark them everyone as most successful and profitable farmers. I believe beef growing and grazing will be just as profitable and if not in the dairy business I would undertake beef raising under the silo system I believe every farmer ought to be a manufacturer. I manufacture every bushel of corn grown on the farm. We grind it at home. We

manufacture our corn, most of it, into the silo. We raise crops suitable for the rations of the dairy cattle. If I went into the hog business I would raise the crops suitable for them.

The CHAIRMAN: Is there any more discussion? Have you any announcements?

DEPUTY SECRETARY MARTIN: Before announcing the program for this evening, I may say, that after we have published our Annual Institute Bulletin and you have had opportunity to read what possibly to-day may seem somewhat dry matter in this paper of Prof. Menges, you may find the solution of one of our great problems. It may possibly bring the farmer to a greater independence in his farm operations, and at the same time bring him closer and nearer to the consumer, which is the great problem to-day for the schools of agriculture.

I may say that your attention should be called to the program for the evening, a very important one, along one of the great lines of agriculture procedure to-day amongst the farmers, that of horticulture. Now, my friends, if you will refer to the program for this evening you will see that the first subject to be treated is, "The Starting of an Orchard," by Prof. W. J. Green, of Wooster, Ohio. I understand there are some men here who are starting orchards in a commercial way. Prof. Green comes to us as one who is an authority, having practiced for years in this direction. Then the next subject will be, "Spraying, the Sheet-Anchor of Success," by Dr. J. H. Funk, of Boyertown, Pa. Dr. Funk is a leader in all horticulture in Pennsylvania. Then we will have "Fertilization and Cultural Methods for Apple Orchards," by Prof. J. P. Stewart, of State College, Pa. This last address will be illustrated by lantern slides. So you see that we have a full and complete program along horticultural lines for this evening at 7.30 o'clock.

I hope those who have not registered will do so. The roll has been called at the beginning of the session. Those delegates and others who are in attendance are invited to register.

SECRETARY CRITCHFIELD: I want to make an announcement. I do not know whether you are going to miss me here to-night or not or whether you will miss me at the other sessions of this Institute, but I want to tell you that I am not going away because of lack of interest in the work. There is nobody more interested in this work than I am. I am delighted to come to these meetings and look these men in the face and hear them tell what they are doing. I am going away to-night to Chicago and from there I go to Milwaukee. There are some manufacturers I want to meet up there. They are men who are manufacturing feed stuffs, and we do get upon our market some most abominable food stuffs and they expect to discuss the question of an international law, a Federal law, controlling the manufacture and sale of feed stuffs, and I want to accept that invitation and see what they are talking about and tell them what I think about the weed seeds and some other abominations we are getting into the feeds that we have to look after continually, and that is the reason I will not be with you during the sessions of this meeting. I hope you will have

a splendid meeting. I know you will have and I know that when you go away from here you will feel that it has been good for you to be here and that you will go out to your work better qualified than ever.

MR. CLARK: I would ask for information. It has been suggested that the paper read by Prof. Menges, which is one of the most encouraging, probably, to be brought before the institute, be printed. While there is a whole lot of truth and facts, so far as we can gather from the reading of the paper, and a whole lot of truth expressed by the speakers present, what I want is this: I presume you would have no trouble to have some of the papers of the city here place Prof. Menges paper in type at once and each member or institute worker could get a copy of the article and study this closely and gather out the things which he wants and which is a difficult matter to gather out all at once. I would like to study that paper and get it out. We can get it all into a section. We can get it in a way without being placed in print, but I have not the least doubt but what some of the printers here could put it in print at once.

DEPUTY SECRETARY MARTIN: We can only say this in regard to this matter, that any paper produced here, if the author is willing, is at the disposal of the press. There is no secret about it. We expect to publish this in our bulletin, yet the press is a mighty force in distribution through the State and Nation that will help agricultural thought and practice, and, hence, if the press should so desire and the author has no objection, I can see no objection to the printing.

SECRETARY CRITCHFIELD: There is no objection whatever. Just so the papers get back to the Department all right.

PROF. MENGES: So far as I am concerned, the papers can publish it.

The CHAIRMAN: Is there anything more?

MR. BARTLEY: I want to say to you that the members of the Board of Commerce of this city have made arrangements to have you visit the plate glass works, the largest in the United States, to-morrow morning at 8 o'clock, and we will go in a body then if the weather permits. Also, this evening, they are desirous of giving a short address here and I believe I have just as much authority now in appointing somebody to respond to that and I will put Mr. Martin to work to-night to make a short response.

DEPUTY SECRETARY MARTIN: That trip to-morrow morning, where do we start from?

MR. BARTLEY: From the Court House steps. We will meet here at 8 o'clock and it will take about an hour or a little over the hour. The superintendent of the company will show us around

the glass works. They will be making the plate glass. It will be interesting to the members that are here to see them making plate glass.

The CHAIRMAN: If there is nothing further the meeting will stand adjourned until 7.30 o'clock this evening.

Tuesday Evening, May 24, 1910.

Mr. Sylvester Shaffer in the Chair.

The CHAIRMAN: It is past the time for the meeting to be called to order and we will have to start now. The first subject on the program for this evening is "The Starting of an Orchard," by Prof. W. J. Green, of Wooster, Ohio, a man who is well qualified to tell us all about this subject and we will hear from Prof. Green now.

PROF. GREEN: I am not going to talk off-hand because I have tried to condense my matter pretty well and I do not know where I would stop if I undertook it.

Prof. Green's address follows:

STARTING AN ORCHARD.

By PROF. W. J. GREEN, *Wooster, Ohio.*

There are various operations involved in starting an orchard. One may know how to do all things needful and yet fail to grasp the full purpose and meaning of the work as a whole. A thorough knowledge of methods is needful, but in order to modify methods so as to adapt them to varying conditions there must be a clear conception of the reason why. Theory and practice are of equal importance, and one must supplement the other.

It is a truism to say, that the orchardist needs, first of all, to get a clear conception of what his purpose is in growing an orchard; but we may properly ask, "Why does a man plant an orchard and then devote the ground to grass or corn, or potatoes, or any other farm or garden crop?" One may answer that he wishes to utilize the land to the fullest extent. The trees need but a portion of the plant food, and all that can be taken from the soil beyond the small amount required by the trees is clear gain. Another may go still further and claim that the cultivation of the crop is just what the trees need. Both of these propositions may be true in certain cases, but altogether false under other conditions, hence the necessity of a well grounded theory to begin with.

There are various purposes to which a family orchard may be devoted, along with that of fruit production. The stock breeder needs a calf pasture, and if the orchard is conveniently located for that purpose he may make it do double duty. This custom is so

common and so well established in most sections that it is regarded as a thrifty practice. There are various side issues for which an orchard may be used, but to describe them would be foreign to my purpose.

We need not quarrel with those who desire to start a dual purpose orchard; but let me hasten to say that a commercial orchard is for one purpose only, and that is for the production of fruit. Unless the crop of corn, potatoes, vegetables, small fruits, grass, or whatever is grown between the trees tends toward the accomplishment of the main purpose that crop has no business in the orchard. The orchard, how to grow it, so that it will give maximum crops of fruit, is the motto, not how to produce bumper crops of vegetables or grains between the trees when young.

It is an unworthy ambition of the orchardist to seek to make the orchard pay its way before it comes into bearing unless he knows how to accomplish the feat without mortgaging the orchard's future. There is such a thing as profitable intercropping. The vegetable grower often practices it, but he knows that it means loss unless tillage is perfect and the supply of food and moisture are sufficient. It is easy, moreover, for him to see when he has gone beyond the danger point and to reform his practice if need be. The orchardist, on the other hand, may so deplete his soil by a few seasons of injudicious cropping that a decade may be required to repair the damage. One cannot afford to take chances in doing anything in the early years of the orchard which may lessen its productiveness in the future.

There is only one safe course in starting an orchard, and that is to take nothing from it at any period of its existence but fruit. Do not pasture the orchard, nor make a meadow of it, nor a cornfield, nor wheat field; in fact make nothing but an orchard of it from first to last. This is the safe course, even though intercropping may some time be allowable. One must furnish his own insurance in growing an orchard and he cannot afford to take large risks for the sake of small gains.

An interesting discussion might be started at this point as to what crops may injure and what ones may benefit a growing orchard; but there are some fundamental matters which need first consideration. A young orchard does not make heavy draughts upon the soil, but the demands increase from year to year until, at maturity, the trees consume annually approximately as much of the plant food elements as does a crop of wheat. It would thus seem easy to determine how much of nitrogen, potassium and phosphorus to apply each year. The problem cannot be stated in such simple terms, however. A complete chemical analysis of the soil, the trees and their yearly products would not reveal all that would need to be known. The physical as well as the chemical properties of the soil need to be considered. The water holding capacity of the soil; the temperature of the soil; the soil organisms, are some of the factors depending upon the supply of vegetable fibre or humus.

It does not seem necessary to discuss the offices of humus nor its importance, for every experienced tiller of the soil knows what its presence or absence means to the soil. Every good soil culturist seeks by crop rotation or manuring of some kind to keep up and add to the supply of vegetable fibre.

Is this the practice of orchardists? The best teachers of orchard culture have always insisted that cover crops should go along with cultivation, but it is an undeniable fact that there has been much more of burning up of vegetable fibre by intense cultivation than restoration of it by the plowing under of green crops "Dutch mulch;" "horse leg irrigation;" "grass mulch," are terms expressive of half truths which have been accepted by thousands of orchardists as the complete law and gospel.

Ask a culture crank if he believes in cover crops as well as in cultivation. He may say yes, and then proceed to show why, in his case, the former is less important than the latter. Believers in cultivation of orchards may not argue against cover crops but the fact remains that the majority do not make use of them. There are a great many cultivated orchards which are in precisely the same condition as are run down farms where the same crop is grown year after year and rotation wholly neglected.

My topic does not, however, relate to the management of old orchards but to those which are still young. The practice of continuous clean culture is even more prevalent with these than with middle aged and old orchards. A practice which is so prevalent must show somewhat of the opinion of those who follow it. If almost every one who plants an orchard crop the soil to the extent of its capacity and makes but little effort to keep up the supply of humus it must be that the opinion is nearly general that such a course is not harmful.

Let us start with the self-evident proposition that the need of humus is greater in an old than in a young orchard. This being true the supply ought to be kept up in an increasing ratio. In practice this cannot well be done, for the cover crops which may be grown between the trees are in a decreasing ratio. We have then, two alternatives; to manure the orchard in its old age, or to fill the soil at the beginning as full as possible of humus, and to keep up the process as long as may be done without injury to the trees. That means to reverse the usual custom and instead of using up the humus as fast as possible hold it in reserve against the old age of the trees. According to this doctrine we ought never, at any period of the orchard's existence, allow the supply of humus to run low, even if cultivation must be diminished, temporarily, or suspended altogether.

No one will deny the need of humus during the productive years of an orchard, and the difficulty of adding to or keeping up the supply at this time is apparent. It follows, then, that to begin early to store it in the soil is the only logical course. Coupled with this must be an earnest effort to save from needless destruction that which is already on hand. Treat humus in an orchard precisely as an annuity, to be jealously guarded against the time when it will be needed most. One can no more afford to fritter away the humus in an orchard by trivial intercropping, and needless cultivation, than he can to put a bank deposit at the disposal of a spendthrift.

Doubtless my position on this matter may seem extreme and some of the statements made may be questioned, but it is hardly worth while to prolong the discussion on this point in view of the necessity of considering the practical details of conserving and increasing the humus content of the soil, while starting an orchard.

There are two methods of orchard management which are commonly regarded as opposite and antagonistic: viz., The grass mulch method and the cover crop and culture method. Formerly I believed fully in the cover crop and culture system and later gave my preference to the grass mulch plan, at least on hill lands, but now the good points of both seem to be about equal. I would adopt either one, or a combination of both, to suit the circumstances and conditions. Both are good, if suitably adapted to the conditions and properly carried out, which unfortunately is not often done.

A cover crop is required by both methods. One involves tillage and the other substitutes a mulch for culture. To start an orchard properly according to the grass mulch method a well seeded tract should be selected, and preferably one in pasture, and to specify more particularly, an old pasture; the best of all being one which was seeded when the timber was cut and never plowed.

Dig holes in the grass two or three feet across and place a liberal mulch about each tree as soon as planted. Mulch each year, gradually extending the circle, keeping out a little beyond the spread of the branches. Mow the grass once or twice each year and if the growth is sufficient it may, for a few years, be gathered and placed about the trees, but it is better to bring in from outside as much material as is needed for mulching, to the depth of three or four inches. In no case should the grass be removed from the orchard. Stimulate the growth of grass so as to produce on the ground as much material as possible for mulching. A little manure or nitrate of soda spread broadcast may be helpful.

In case of thin soil it will not be possible to get a satisfactory growth of grass without the use of some manure, but the aim should be to grow grass, taking care, of course, by mulching, to prevent harm to the trees by the grass. The young trees do not suffer in any way but make a satisfactory growth and come early into bearing. The uniform condition of the soil about the trees as to moisture and nitrates is remarkable. There is much that may be said, pro and con, regarding the merits of this method, but the unity of my paper would suffer by taking up the argument.

There is only one thing to be considered here and that is the undeniable fact that while the trees are young and are making very light demands upon the soil, there is a gain rather than a loss in fertility. The humus supply is increasing rather than diminishing. It may be objected that it is a waste to allow the soil to stand almost idle for nearly a decade. We have no right, however, to charge any more than rental value of the land to the orchard in addition to labor and material. If we should charge the net value of the crops which might be grown, then the fertility which has been taken must be charged against the crops. We must go further than that and insist that after the cropping, all of the fertility which has been removed must be returned to the soil. Let any one plow up an old pasture or a good meadow and crop it for ten years, leaving it as good as he found it. If he accomplishes this he will practice better farming than do most orchardists who crop the soil in their young orchards.

My contention against the cropping of young orchards, is not to oppose the practice itself, but to object to the method which robs the future for the sake of the present. An orchard is not

well started unless its future is fully considered. The only reasonable and safe attitude which one can take who proposes to crop his young orchard is to place the needs of the orchard first and the crop second. He must look ahead and consider carefully what effect the present management will have upon the orchard. Half of a ten year old orchard at the Ohio Experiment Station has been in grass, and the trees mulched, since planted. The other half has been managed according to the cover crop system since the beginning. It was intended that the cultivated portion should be divided and half devoted to ordinary cropping and the other half given over to the cover crop system pure and simple. There is some slope to the field, however, and washing began to take place on that portion where no crop was standing in the winter. It was, therefore, found advisable to change the plan so as to include all of the cultivated portion under the cover crop system of management.

The plan which has been followed thus far is to sow soy beans in drills two feet apart, about the first of June. The beans are kept cultivated until August, when rye is sown, to be plowed under in the spring. The soil is rather thin and the beans have not been cut but allowed to stand over winter. Had the soil been very poor a better plan would have been to plow the beans under before sowing the rye, but they have served to keep the soil from washing, and apparently it has not been necessary to plow them under, for the benefit of the trees. Buckwheat or oats might have been substituted for the beans if the soil had been very fertile. Crimson clover, or some other legume might have been substituted for the rye a part or all of the time, but no reason for a change has been discovered. The trees are in good condition and have begun to bear. There is no evidence of too much nitrogen. As shown by the crops the soil is steadily improving.

Could not the same results have been secured by taking off some cash crop? On this particular soil the case would have been somewhat difficult; the nearest approach being potatoes, using a fertilizer high in phosphoric acid, following with crimson clover or rye. Our experience with crimson clover has not been such as to warrant placing much dependence upon getting a stand, nor has vetch proved reliable. Field beans might be used in place of soy beans, and rye sown after the beans are harvested.

On most soils a money crop might be secured each year and some crop plowed under each spring. It ought to be a settled policy to have some crop standing on the land over winter. It ought to be an almost invariable rule to plant the summer crop in rows to admit of cultivation, for the purpose of conserving moisture. If the plan is varied, as for instance when a crop of red clover is grown to plow under, then let the trees be mulched during that season. If, also, soy beans or cow peas are sown broadcast mulching ought to be attended to.

I am not prepared to say whether or not some of the leguminous crops may or may not be made into hay and removed from the orchard. The roots and stems of these crops constitute so large a portion of their value that it is possible that the tops may be spared from fertile soil. At least, for a short period, the plan may be practiced without loss. It is a common practice among orchardists not to grow a summer crop, but to keep the soil clean by cultiva-

tion. If one is studying his orchard he is likely to know whether it needs more nitrogen or if it is suffering for water. The practice of growing cover crops for the benefit of the orchard admits of great variation, and there is need of careful study of all the factors involved. It is possible by the use of leguminous crops and cultivation to increase the supply of nitrogen beyond the needs of fruit trees; causing too rank a growth and preventing coloration of the fruits. This does not necessarily mean that there is too much humus in the soil nor that the practice of turning under of green crops is to be discontinued. It means that the kind of green crop is to be changed. It means that the kind of green crop is to be changed and cultivation lessened.

On this matter there is much misconception and, in consequence, error in practice. It should be remembered that cultivation sets plant food free and conserves moisture. The first of these offices is less important in a young orchard than the second. Cultivation should not be haphazard nor excessive, and should be so regulated as to prevent loss of moisture, for the most part.

Just here is the weak point in the common practice. The soil is often kept bare in the early part of the season and thorough cultivation kept up. This goes beyond the necessities of case with young orchards. Cultivation for the purpose of saving moisture is not to be timed by the calendar, but is rather to be regulated by the weather. After each rainfall, even though slight, the soil is to be stirred and just often enough to break the crust and to keep the surface mellow. More frequent stirring of the soil than this, if given without reference to the conditions, may accomplish no more in conservation of moisture and yet burn up more humus. It is the recklessness regarding the humus supply which needs reformation. In the case of young orchards there is, in the first place, too little thought as to how to get humus into the soil, and after that how to conserve it. The conservation of moisture is not to be considered more than that of humus. In other words, there needs to be a much nicer adjustment of processes in conserving both water and humus. The culture side has been put too constantly forward, and only half of the conservation side has been considered.

It is easily possible to force a young orchard into too succulent a growth by injudicious tillage. This is commonly understood with reference to tillage late in the season, but when clean culture, with no crop growing between the trees, is carried beyond the necessities of preventing the waste of moisture there is, beginning with warm weather, a notable increase of nitrates. All orchardists will agree that, at the beginning of the bearing age of any kind of a fruit tree, the nitrogen supply should be limited.

Tardy bearing is sure to result if fruit trees are forced when the fruit buds are forming. In tilled orchards the nitrates begin materially to increase early in June, in this latitude, and do not greatly diminish until cool weather comes. In mulched orchards the nitrates are less abundant at this time and are more uniform in quantity. This may explain why mulched trees in grass begin bearing earlier than those under cultivation.

The inference is plain; there ought to be a crop on the land all of the time to take care of the nitrates, and that cultivation should

be mainly to conserve moisture. The theories which have been promulgated regarding tillage and cover crops are not founded upon sufficient data. They are not well balanced. There are facts coming to light which will compel a revision of the views now held and a restatement of theories, not only regarding tillage and cover crops but of mulching as well. The practices in vogue do not, however, match with the theories, in many cases. In my own state the usual custom in the peach region is to practice clean cultivation during the early part of the season and then for a cover crop allow the weeds to grow. The country over this custom is more prevalent than any other.

The next most common practice is to cease cultivation early and then to sow a cover crop. Where grass is used as a cover crop it is, for the most part, pastured or made into hay. Mulch, when used, is put near the trees, and commonly the grass is taken from the centers for this purpose. It looks, after all, as though no one has a very firm belief in the theories anyway. Not, at least, what might be called a saving belief. It seems to me, at present, if we accept as a fundamental doctrine that humus should be formed and conserved to the greatest possible extent in the early years of the orchard that there is little need of doing more than to modify our practices according to circumstances.

So far as I know there is nothing in this method which may not be applied to any kind of fruit trees. A peach tree is not to be treated precisely the same as an apple tree, nor is any class of trees to be managed the same on all kinds of soil. There is no reason, however, to say that one kind of tree should be mulched and another cultivated, nor that a certain kind of cover crop is to be used exclusively on particular species of trees.

Aside from cultural methods there are many other matters to be considered in starting an orchard. The choosing of an orchard site; the preparation of the soil and planting of the trees will not be discussed, and the selection of varieties must be left out. One ought to take two or three years to get ready to plant an orchard. He must study soils, varieties, methods, and markets, and inform himself as to the best place to buy trees. The last item is not mentioned because I have lists of honest nurserymen and truthful agents to hand out, but for the reason that it takes some time and tact to get results in that line.

One needs, first of all, to get acquainted with an intelligent and reliable nurseryman. There is no need of scraping acquaintance with tree agents or dealers unless your wits need sharpening or you are hankering after experiences of all kinds which are thought to be necessary to make a trained horticulturist. You must, however, hunt until you find a nurseryman who is just as anxious to do you a good turn as he is to take your money. If you cannot find that kind of a man of whom to buy them grow your own trees and propagate from the best bearing trees that you can find. When buying trees take them not according to height and caliper but as to age. A one year old peach tree, and others one or two years, according to the way they have been started in the nursery, or how you expect to handle them. If you want a tree with a low top you may have to take a yearling tree as the two year old trees may have too high a top. If you believe in planting corn in your orchard the

first year a two year old tree is better than a one year old. If you accept trees according to size you may get old stunted trees that are no larger than good two year olds should be. Better get the largest and finest trees in the nursery, of a given age, even at two prices, than to accept culls of uncertain age and low vitality.

It is really a profitless discussion to give pros and cons as to age and size of trees to use. A good orchardist will choose a good tree of the size and age which suits him and he will get results, no matter what the size and age. One thought about the preparation of the trees for planting is sufficient. A vigorous fresh tree will grow, even if not pruned at the time of planting, but some shortening of both the top and roots is advisable, and very severe pruning may be practiced if desired. If the top is cut back to a mere short stub and the roots left in the form of a club, with nothing but a main stem eight or ten inches long, and put into a hole made with a crowbar there need be no fear as to the result. But insist that the nurseryman deliver all of the top and root intact, as then you will see what you are getting. If he sends trees with crown galls on the roots you can either burn or send them back.

The distances of planting and the use of fillers are likely to be disputed questions for a long time. We thought that we had this matter pretty definitely settled, but there is now a marked tendency to closer planting and heading in. As applied to peach trees, this plan appears to have merit, for they are amenable to severe cutting back. In the West, apple trees are treated after somewhat the same manner. The planting is much closer than in the East. The practice of using fillers in an apple orchard has more advocates than formerly. Beginners are usually more in favor of it than those who have had experience, but of the latter class those who feel themselves competent to destroy trees when need be, favor some plan of close planting, with a view to thinning.

There are possibilities in close planting, and yet there is danger in it. It is a matter which will not down and it must be studied and discussed. As to the ability of the soil, under good culture to sustain, for a reasonable period, from two to four times the number of trees which are to stand permanently there can be no question. The danger is not in overtaxing the soil and of robbing the permanent trees of food. The injury to the permanent trees is more likely to occur because of shading, causing, or forcing, the trees to run up to too great a height. This may happen before the owner is aware that crowding has occurred. Then too, the fillers shade the cover crop and check its growth, thus reducing the supply of humus. It is apparent that the fillers are thus indirectly robbing the permanent trees. If varieties having a small top are chosen for fillers the danger is lessened, but most of the sorts which begin to bear at an early age are vigorous growers.

A comparatively safe plan in an apple orchard is to plant the permanent trees 35x40 feet apart and then to put in an equal number of fillers, such as Yellow Transparent and Wagener, so that the trees stand 20x35 feet apart. This plan admits of room for spraying operations and avoids, to a great extent, the danger of too close planting. The use of peach trees as fillers in an apple orchard is open to objections, aside from those enumerated. The treatment

of the two kinds of trees is often different and causes may often arise where one or the other might be greatly injured by the same course of management. In any case the peach tree is too gross a feeder to be planted with apple trees, and it will be found to greatly interfere with any well planned course of apple orchard management. To say the least a young apple orchard having peach trees in it is exposed to very great danger. The pruning of a young orchard is simple but important.

High headed trees are less in vogue than formerly and with their passing we have less trouble to keep our trees from leaning and becoming lop sided. If we see that three or four good branches start out at different heights around the main stem and are kept about equally balanced there is not much more that really must be done. It is well worth while, however, to shorten in these branches each spring. This cutting back may be regarded as essential to peach trees; very useful in the case of all dwarf trees and of considerable advantage to apple trees. It is done with peach trees to prevent over bearing and breaking down, to keep dwarf trees in shape and to secure good thick strong branches on apple trees.

A peach orchard is not up to date unless the trees are cut back every year. If labor were easier to secure and to train it would be a good investment to do much more careful pruning and shaping of our apple trees. The branches might be better placed; made thicker and stronger and better exposure of the centers of the trees to sun and air made possible. Considerable pruning in future years might also be avoided by doing more in the early life of the trees.

In this discussion, an effort has been made to elucidate certain features which hitherto have not been given a fair share of attention. If the ideas advanced have no other effect than to awaken thought and lead to deeper study as much good will be done as can reasonably be expected.

The CHAIRMAN: Is there any questions to be asked Prof. Green? If any of you have questions he will be glad to answer them.

PROF. MENGES: I would like the Professor's idea why he opposes planting peach trees with apples.

PROF. GREEN: The peach tree put in the center row in the apple orchard may not do much harm, but they grow faster than the apple trees and very often need different kinds of treatment, especially with regard to growing of cover crops. Of course, these things ought to be taken into consideration. You ought to know your soil and how the trees will come out before you attempt to grow peach trees among apples.

DEPUTY SECRETARY MARTIN: Now, gentlemen, you have an instructor in horticulture here who offers you a very rare opportunity to get points in cultivation and handling. Now is your opportunity. Embrace it and ask questions on this important paper.

A Member: Mr. Chairman, I would like to ask if one of the reasons for not planting the peach with the apple is on account of the feeding of the peach which gets to bearing before the apple does—the feed for bearing and not for growing wood?

PROF. GREEN: Well, if your soil is quite fertile and you are growing cover crops all the while you will probably force the peach trees along. They would not do as well as by themselves. Another reason is, if you are following out the idea that I contend for, that you should put all the humus you can into the soil, your peach trees will do more harm. They shade the ground and rob the future of the apple tree and my experience has been that on good soil the peach trees have got to be taken out when ten years old. That is, we think we do pretty well if we get one crop during that time and it certainly don't pay for the trouble.

MR. NORTHUP: If the soil is made fertile, as it ought to be, before the orchard is planted, I don't see, if you keep up the fertility, why such crops as potatoes and tomatoes and pickles and their like cannot be raised in the orchard while the orchard is young and growing.

PROF. GREEN: I don't consider humus and fertilizer as exactly synonymous. Humus does contain fertility. It has another object. It holds moisture in the soil. So that I would really get up the supply of humus in it, but I would not really get as much fertility in the soil. That would not be the object altogether. I would want to store up humus and the cultivation of crops would destroy it.

MR. NORTHUP: Living within ten miles of a city with 129,000 people, it means something whether you can grow potatoes and tomatoes and pickles, and you will have some money while your orchard is growing at the same time.

PROF. GREEN: I admit all that. Of course, there are conditions. You cannot lay down general conditions that will apply to all farmers in this matter. There are to many varying conditions for a general rule.

MR. J. ALDUS HERR: We have an orchard in Lancaster county, probably three-quarters of an acre, in which the trees are healthy and in good condition and in grass, not being pastured in any way except a few pigs running in it and we plant nice thrifty trees and they will grow and look rich and yet probably go eight or ten years before they will bloom. What shall we do to get them to bloom early?

PROF. GREEN: Soil very fertile?

MR. HERR: I should think so, yes sir. It is clay soil on limestone, with sod.

PROF. GREEN: There are cases where you have to do something to check the trees growth and check it quite severely. In that case it may be well to allow the grass to grow and pasture the orchard or do you pasture it?

MR. HERR: Not more than the pigs.

PROF. GREEN: In some cases it is better to seed the orchard down to timothy until you get the orchard bearing heavy.

MR. HERR: I have one tree twelve years old or older and it has not had a blossom yet.

PROF. GREEN: Possibly that is in the variety.

MR. HERR: It is not, because it is the Baldwin.

PROF. GREEN: I would give it a pretty severe checking in some way.

MR. HERR: How shall I do it?

PROF. GREEN: I cannot say positively without seeing it and studying the conditions. It would not be by cultivation that is sure.

DR. CONARD: I would like to ask what guide you go by in the fertilizing of mature orchards? What guide you have got at in fertilizing the growing orchard and yielding orchard? In other words, what guide you go by in the quantity and requirements as to fertilizing?

PROF. GREEN: Well, I don't know as any guide can be given? You have got to study the orchard and if growing too fast try to check it. If not and the foliage is yellow give nitrogen. There are times that you cannot make an orchard bear to any extent and another time that the trees look sickly and yellow and it takes a long while to get them in condition. I don't believe there is any other way than experimenting.

MR. BRUCKART: In regards to clean culture, the growing tendency is for cover crops. Is there any difference or comparison in the insects with or without the cover crops? Would not clean cultivation be better?

PROF. GREEN: That question has been brought up a great many times. I have seen orchards grown each way. I find both have their troubles. I don't know that one is worse than the other. Some years ago it was asserted that some insects were worse in orchards growing in grass, and I wrote to leading entomologists to give me some facts on the subject and not one gave me a fact.

MR. CARD: I would like to ask whether that is true of high land or fairly moist fertile land. The problem comes to us that some orchard land is high thin land. The question is whether that kind of land is adapted to the mulch method?

PROF. GREEN: Our soil is not good enough to grow grain and very much corn or potatoes. It is what we call thin land and worn soil; been in timothy for sometime and timothy very thin. Now blue grass is coming in but not good enough soil to grow good grass. It is of a somewhat sandy nature; not real sandy but when it has washed out it shows a fine silt and it is not good farming land. We are trying some thin soil, so thin that it will not grow grass.

MR. CARD: What are the prospects so far on this soil?

PROF. GREEN: We have got one man there in the southern part of the State who lives eight miles from the river. He hauls straw out for it, hauling out eight miles and he thinks it pays. I notice there is a great deal more grass coming just by the use of the mulch and he does not mulch very heavy.

The CHAIRMAN: Any others? If not we will come to the next topic, "Spraying, the Sheet-Anchor of Success," by Dr. J. H. Funk, of Boyertown, Pa.

Dr. Funk then delivered his address as follows:

SPRAYING, THE SHEET-ANCHOR OF SUCCESS.

By DR. J. H. FUNK, *Boyertown, Pa.*

Mr. Chairman, Ladies and Gentlemen, Fellow Farmers and Fruit Raisers: I feel it an honor to stand before this assembly this evening; but I must admit it seems somewhat mysterious why I am put upon the program annually to talk before the intelligent audience that compose the State Board of Agriculture and my fellow-lecturers. And were it not for the fact that our worthy Deputy Secretary of Agriculture is very fond of a joke it would be difficult to ascertain the reason.

I feel somewhat lonesome, and am placed in the position of the German soldier, who, in the quiet hours of the night was visited by a polecat, who let his presence be known in his own characteristic manner; finding that his tent-mates were all asleep, exclaimed: "Mine Gott! I haf to schmell it all mine self." I will endeavor to do my best in a very brief manner.

Emerson says, "The man who writes a better book, or makes a better mouse trap than his neighbors will find the world making a beaten path to his door." I am not going to write a book, neither am I going to make a mouse trap, for I have a beautiful yard covered with a rich carpet of grass, and I do not want it trodden down. But I will give you some of my practical experience with spraying that may be of benefit to at least a few of you.

Spraying, from some cause or other, is more neglected or less understood than any other important factor in fruit raising. And

yet in these times of insect depredations and fungus, and bacterial diseases, it is pre-eminently the most essential of all means employed in the production of choice fruit.

So necessary has good spraying become in order to obtain good fruit, that many have fallen into the error of thinking that spraying is all that there is to fruit raising. We must not cease to remember that however important spraying is, it is only one of the factors, pruning, fertilizing and cultivation are all so closely allied that entire success depends upon their joint efforts. Any one of these last may be occasionally omitted; but spraying is an absolute necessity, for what availeth it if you raise a large crop and lose it through a worm hole.

In this talk, I will not enter into details as to the great value of spraying; we are past that stage. There are few that do not believe in the value of the copper salts, or the compounds of sulphur as fungicides, or the arsenates as insecticides and the emulsions for sucking insects. There are many who do not spray, but the practice is giving such good results that there is an annual increase in the number of those who thoroughly spray their trees. So it is no longer a question as to whether it is good, but how, when and with what to do it. Sometimes we hear of unsatisfactory results, but it is not the fault of the system, but the improper preparation or application of the same. One must familiarize himself with the nature and habits of the organisms he wishes to destroy. To perform an operation intelligently you must thoroughly understand the reason why you do it, otherwise success is merely accidental. You need not necessarily know all the diseases by name or the life history of every insect, but the more you do know about their origin, their methods of propagation, where they pass the winter, whether in the egg, larva, pupa or in the perfect form, when they appear in the spring, how they affect the tree, plant or fruit, whether by eating or by sucking, the more you know of these facts the better you will be prepared to attack them in their most vulnerable form.

Most of the fungi are internal parasites, they must be attacked in the spore stage. Spraying for fungi is more largely a preventive than a curative measure. Spraying for insects and fungi is a form of insurance whereby the grower may secure larger crops, of finer, brighter and firmer fruit, possessed of higher quality than could otherwise be obtained. By spraying, the benefits are plainly seen by the increased health of the tree or plant, the foliage being thicker, richer in color, and free from fungi, thus enabling them to perform their functions of preparing plant food. Should a tree from any cause become defoliated, it loses its power of assimilation and preparing the food for the tree bud and fruit. It carries its influence farther, preventing the premature dropping of the fruit.

Spraying is, to a certain extent, cumulative, its benefits are not all seen the same year of application. This would of course not hold good with plants that grow their stock, develop their buds and mature their fruit the same season, such as the annuals. But with all trees that form their buds the previous season, such as the apple, peach, etc. Spraying is not a panacea for all the causes of failure with fruit raising. It will not take the place of pruning, fertilizing, or cultivation. An orchard that is unproductive from neglect, lack of tillage or worn out soil, cannot be made productive by spraying alone, but it is one of the essentials.

Thoroughness.

There are many failures from lack of thoroughness. A tree or plant need not be sprayed until it drips from the foliage and runs down the limbs and trunk, but every part should be thoroughly moistened. Another cause of failure, is the use of the wrong material, a fungicide is often used for insects, and an insecticide is used for fungus diseases. The method of combining ingredients must be understood, or the preparation used is often valueless, and time and material lost with little or no benefit. This is often the cause of failure with lime and sulphur, in destroying the San José Scale. Another cause is the application is made at the wrong time, too early or too late (time and material will be given under the head of Insects and their Treatment).

Apparatus.

It is necessary to have a cooker of sufficient size, several barrels or tanks, and a good strong pump that will give a pressure of 100 to 150 pounds pressure. Only large size barrel pumps, with a large air chamber, and a long strong handle is capable of giving and maintaining this amount of pressure. This should be firmly attached to a barrel or tank, mounted on a wagon or sled. The air chamber and working parts should be inside the barrel, with the piston at the bottom, when it is always primed ready for work thus saving considerable pumping, and at the same time placing the weight low down, making it less liable to upset. Such a pump is sufficient for an orchard not exceeding five to ten acres. Most outfits are furnished with too short a hose, being impractical for doing good work. Not less than forty feet should be used, and fifty feet is better. There should be an extension pole of eight or ten feet, with a good leakless valve at the bottom with good large nozzles attached at the upper end with a bend or angle thirty-five or forty degrees that the spray may be conducted downward into the calix cups.

For orchards of larger dimensions some good power outfit is essential. There are many good power sprayers on the market for the orchardist to select from. Were it not for the deterioration of the lime-sulphur mixture, I would prefer the gas sprayer, it is one of the best powers, prompt and uniform in its action regardless of the number of nozzles in use. But the Carbon Dioxide renders the spray useless for the destruction of the San José Scale. Compressed air is another power that is giving very good satisfaction.

The gasoline engine power seems to be the general favorite, as it gives sufficient power for all purposes, and when not in use as a sprayer the engine can be used for other work on the farm. The one drawback has been that all of the gasoline powers, they require a safty valve to relieve the pressure when the nozzles are closed, returning the liquid to the tank. This is all right as long as the valve lasts, but unfortunately the lime-sulphur solution returned under pressure soon wears away the seat of the valve and it must be reground or a new one put in its place, this is both annoying and expensive. I know of but one maker that has overcome this difficulty, they have a regulator placed between the tank and the pump. It has a piston that is acted upon by the back pressure

whenever the nozzles are closed. You set this regulator by a screw at any pressure you wish up to 200 pounds if desired. When the nozzles are closed the back pressure lifts the piston contained in the regulator and cuts off the supply to the pump and lets the engine run empty, thus using less gasoline and relieving the machinery of all strain. I have used one of these regulators this season and it works like a charm. The only objection to this is its expense, costing $20.00. If the trees are tall a tower is a great convenience and causes better work to be done, as the operator can stand above and throw the spray downward into the calix cups.

As to the stationary part of a spraying outfit, is very important if the orchard is of good size to have a building of sufficient size to cover a boiler, cooking tanks, mixing tanks, various materials to be used in the compounding of the various spray mixtures. If this can be located on a side hill, that elevated platforms can be had, that the material can be run by gravity from the cooking tanks to the graduated dilution tanks, from there to the tank on the wagon. This does away with much of the heavy and disagreeable part of the work. Then if you have an elevated tank or reservoir to hold the water supply much time and labor is saved. Many of these conveniences can be had with but little outlay of money, and spraying will no longer be the disagreeable work of the past.

Material.

I do not wish to condemn any material, or do I wish to advertise any article manufactured and placed upon the market. But my firm conviction is, all things considered, that the lime and sulphur solution, when properly prepared, is the best and most economical spray of the present time. It is one of the best we have for San José Scale, it destroys the eggs of the Tent caterpiller, canker worm and many other insects that are injurious to our trees. It is one of the best fungicides that we have. It is a specific for Peach leaf curl. Then as a summer spray it is taking the place of the copper salts, being cheaper and better as it does not injure foliage or russet the fruit, and if one of the arsenites is added it does the work of the two with but one operation.

As to whether the Commercial, or the home-boiled shall be used, depends upon conditions. For the farmer who has but small orchards, or is not prepared to cook the material, the Commercial solution is more convenient and I believe more reliable. But for the man who has large acreage the home-boiled is much cheaper, if he has the proper outfit he can manufacture it for about one-third the cost of the commercial, or one cent per gallon. The formula for the home-boiled is thirty pounds sulphur, forty pounds lime, 100 gallons of water.

This can be used only on dormant trees. If the Commercial solution is used it must be of sufficient strength. As recommended by the manufacturers, one to eleven is too weak; it should be one to eight, at which strength I find it to give satisfaction. As a summer spray it must be diluted about one to forty or one to fifty, this is for apple, for peach this is too strong, I have known heavy losses to occur from using this strength. In fact, I consider it unsafe to use on the peach as a summer spray. As a summer spray for

the peach I use the self-cooked, using ten pounds sulphur, fifteen pounds lime and 100 gallons of water. For the apple I use sixteen pounds sulphur, twenty-five pounds lime to 100 gallons of water. This strength is safe, and I believe it will in the near future supercede Bordeaux mixture as it does not russet the apple as does the Bordeaux mixture, and when used on peach as soon as the calix drops from the small peach it reduces fungi to a minimum, and when arsenate of lead is added it destroys a large part of curculio. It appears that the arsenate of lead also possesses fungicidal properties, and if used when the fruit is nearing mature size it tends to aid in the coloring, and preventing the manilia, or brown rot which in some seasons causes heavy loss.

How Often Shall We Spray and When?

Ordinarily three times is enough, occasionally four times is better. 1. Either in the fall as soon as the petals drop, or early in the spring before the buds expand sufficient to be injured. For apple, I believe the fall spraying is the best. We generally have more time, the weather is usually more favorable, we are not troubled with such strong winds. In the spring we frequently have strong northwestern winds for a week or ten days at a time, and very few days with the wind south or southeast. Thus we often find it difficult to spray the tree on both sides. Fall spraying has another advantage, we catch many of the lice crawling about having no protection and so are easily destroyed. And the tree suffers less than if they were feeding upon it during late fall and favorable weather in winter. For peach I prefer spring spraying, as one application answers for the Scale, and as fungicide to prevent the leaf curl.

2. Spraying depends upon conditions. Some seasons we have an epidemic of Aphis, like the season of 1909 when the foliage and fruit of the apple was seriously injured all over the country. For these pests we spray with one of the emulsions, just as the buds begin to open and the small leaves are forming.

3. Spray, as soon as the petals drop, or inside of ten days. At this season the calix cups are standing erect and open in the most favorable position to receive the poison. At this time by spraying from above downward with a good pressure some of the poison will be forced into the cups, but if left later the sepals close and no poison can enter. This is important as from seventy to eighty per cent. of the larva of the codling moth enters the fruit from the flower end. If this contains poison the small worm takes its first meal and perishes.

4. Spraying should be about twenty days later. Many bulletins recommend ten days after the petals drop, but this is too early, as it is seldom that any young larva are hatched before July, as the life history of the insect shows. The larva passes the winter in the cocoon in some secluded place. During May the larva opens the end of the cocoon and spins a silken tube to the surface, then returns to the cocoon with its head to the opening, and sheds its coat, and transforms into a pupa, which is its dormant stage, during which time it goes through most wonderful changes from a worm into a winged moth. This transformation averages about

sixteen days, time depending upon the weather. At the end of this time the pupa wriggles out of the cocoon, this takes place from the 10th to the 20th of June. If the weather is warm the moth begins laying eggs in five or ten days, and die in a couple of weeks. So the eggs are laid the latter part of June, or the beginning of July. The eggs hatch in five or ten days. So it is seen that in average seasons, the eggs do not hatch inside of a month after the blossoms drop.

Now, as the eggs are laid, many of them upon leaves some distance from the apple, the small worm eats its first meal from the tender leaves, and if these are coated with poison it is killed before it reaches the apple. And if this poison is put on shortly before the egg hatches it is less liable to be washed off. Should the larva escape, reach and enter the calix and this is poisoned its career is ended. Otherwise it enters the apple and feeds upon the seeds preferably. In twenty-five or thirty days it attains full size, eats a hole out and crawls to some secluded place and pupates. Some of the earliest ones mature and lay eggs this same season giving the second brood. These are the worms found in the apples at gathering time. To catch these spray in August, and if a fungicide is added to the insecticide, it has a tendency to keep the foliage clean and healthy, thus adding to quality of the fruit.

I consider three times spraying sufficient for the apple. First, for scale; second and third, for the Codling moth, curculio, canker worms, and other insects, as well as for fungus diseases. In the season 1909 my fruit was so clean that six men hunted for three hours to find a wormy apple without finding one.

The last of my fruit was sold May 20th in the Philadelphia markets, at prices ranging from $4.50 to 6.00 per barrel which testifies as to cleanliness and quality of my fruit. Out of the many hundreds of barrels of apples, there was not one that needed repacking. For home use I keep them in a cave and expect to have until July.

I prefer spraying my peach in March, with lime and sulphur, full strength, for the scale. I gave them their second spraying with self-boiled lime and sulphur May 14 to 18, using formula, 15-25-150, with six pounds arsenate of lead. My next spraying will be sometime in June after thinning is done. My third spraying will be with the same material. This will be for control of fungus diseases such as fly speck fungus, wilt, etc. Since I have been using the lime and sulphur sprays I have not been troubled with Manilia, or Brown-rot.

I am often asked if the Bordeaux mixtures are not safer and more reliable. Perhaps on the apple it may be just as good, if you are satisfied with russetted fruit. I have never been able to use it dilute enough to benefit and not injure. The peach is especially susceptible to injury by the copper sprays, no matter how dilute.

Recapitulation.

Train your trees low.
Keep heads open by judicious pruning.
Spray while trees are dormant.
Cover every trunk limb and twig.
Use a good spray suitable to the occasion.

Spray as soon as blossoms drop.
Use a combined Fungicide and Insecticide.
For Masticating Insects use Arsenate of Lead.

Spray twenty or thirty days after blossoms drop. Use the best equipment obtainable. Use a high pressure. Spray from the five sides, north, south, east and west, then from the top side.

Spray at the right time, with the right material, in a right manner, and 95 per cent. of the fruit will be clean, and your success will be assured.

A Member: Doctor, about how much water do you use in the operation of preparing the spray?

DR. FUNK: While I am boiling?

A Member: Yes sir.

DR. FUNK: In the first place I have my tub there where I mix my sulphur in. I want the boiling water to start with because the lime we have is not quick enough. We cannot get it started with cold water. I put in for instance a gallon of water or, throw my sulphur on, stir and put a little more water on and stir and add more water until I get it to a thin slop. I put four or five gallons in my cooking tank and as soon as that water acts on the lime I pour this thin sulphur mixture on the top and then stir with a paddle so that it will not burn. It will burn dry very quickly. Stir until it gets smooth and until it ceases boiling and then I turn the hydrant in at once and dilute and run it down into the tank and this will not crystallize like the other. That is the method that I use.

MR. BRUCKART: Don't you boil it an hour?

DR. FUNK: I don't depend on time in my cooking. As soon as I see that it has reached the right color and the sulphur is dissolved so that there is no residue there, that the sulphur is taken up and dissolved, I consider it done and after it is run into the tanks and diluted and strained it is ready to spray right on the orchard. We take it right away. It matters not whether it takes thirty or forty-five minutes or an hour and a half.

I want to say here in regard to my peach, in spraying with that summer spray I forgot to mention that I use in addition with that six pounds of arsenate of lead. By that means you will notice there is no spray on that fruit. Before using it we had a curculio season and by that we did check it. Six pounds of arsenate of lead with 100 gallons of water.

A Member: Any of those three times?

DR. FUNK: Yes sir. I say that is for the apple. I prefer the Fall spraying of the apple for this reason: We have more time in the Fall of the year; the weather is more favorable, we are not subject to those strong northwest winds. Why you know that for instance in the Spring of the year for a week or ten days we have a continuation of northwest winds without one single day with winds from the south or southwest. This past Spring we have had more from the south or southwest, but ordinarily we haven't. But when it comes to the peach I want to spray in the Spring; but for the apples in the Fall. It has another advantage: We get those little rascals at the time they have no clothing on them and when we put that on with a strong force, with 150 to 200 pounds pressure, they are about gone. And then there is this advantage that the tree is not injured by the sucking of the nourishment out of the tree during the Fall or nice Winter. What I sprayed last Fall I could not find one single leave louse whether I used the home-boiled or Commercial. I tried both this last Fall. So that I am satisfied of the benefits of Fall spraying. But with the peach I want to spray in the Spring for this reason: One spraying answers the two purposes. It acts for the scale, etc., and at the same time it is a preventive for the peach leaf curl, so that one spraying operation does the two things at one time.

A Member: Don't you have less trouble with the scale getting on your apples in the Fall if you spray in the Spring?

DR. FUNK: They are more likely to because the more likely you have the limbs covered. But if I spray with that and they are not all killed I touch that up in the Spring and you have a double chance at them and the touching up of these spots is one of the most effective ways of combating them because you cannot spray too thorough.

Now, when shall the second spraying be? Excepting in occasions like in the season of 1909 when there was an epidemic of green aphis, we will spray just after the blossoms drop.

MR. HILDEBRANT: Dr. Funk, what is the matter with that?

DR. FUNK: That is from a Baldwin tree?

MR. HILDEBRANT: Yes sir.

DR. FUNK: You will see the fungus disease on that. I want to say that if that tree had been sprayed just at the time the buds were opening and the little leaves beginning to shoot the spores would have been destroyed.

A Member: Doctor, does this spraying prevent the yellows?

DR. FUNK: No sir. I just want some remedy that will prevent the yellows. That is the only trouble that I have in my peach orchard. Every once in a while I have to take out some of them.

Here are some limbs from my orchard. Look at the set of fruit. The people can see what a world of trouble we have when I tell you that we have to thin that so that I can put my hand between the fruit. Where there are clusters there I am satisfied that nine-tenths of them will have to be taken off. And I want to say I have a young orchard there, 500 in a block, three years old this Spring; last season gave nearly a basket to the tree; just reaching the fourth summer; next Spring four years planted. This year I expect not less than three baskets of fine fruit to the tree. Now that may seem pretty stiff to some of you, but there are a number of people here who have been in my peach orchard. Our Deputy here was there. Why if you had seen him eating peaches until the juice ran down over that beard you would have seen what his capacity was.

A Member: Have you sprayed cherries with the lime-sulphur?

DR. FUNK: Yes sir, on my sour cherries this year. I want to say that you can use the lime and sulphur and it will check up that brown rot better than anything I ever used, whether on the cherry or peach. I consider the lime-sulphur the best and that it will supercede all other sprays that we have.

A Member: Have your tried it on your potatoes?

DR. FUNK: I have not yet. I am going to try it this year on my potatoes.

MR. BARNES: Doctor, a tree that has the yellows, can you save the tree for any length of time by using any kind of treatment?

DR. FUNK: You can save it by burning it and putting the ashes in a jar. We have some people in the State of Pennsylvania that have made experiments along that line and say they have a specific remedy for the yellows. I want to say that there is a fortune for the man that has it. The very first symptom means the discovery and just as soon as we detect that we cut the tree out, pull out the roots and burn the whole thing. If you leave it stand, and that is the trouble,—you don't like to sacrifice the profit from the crop of fruit and it is left remain until that time and by then it is conveyed to may be a dozen trees around, because I believe it is as contagious as smallpox in the human family; and by taking out in the first symptoms we can kill it that way.

MR. CLARK: Don't you think a man with yellows about his trees really often is mistaken about the disease?

DR. FUNK: There is many and many a tree condemned as having the yellows that has never had it. It may be from starvation or worms or other causes that makes them yellow. But when you find premature ripening of fruit on a single limb you may be convinced that you have the yellows and it has kind of reddish little fine leaves and if they get fruit on it will be beautifully colored. You will find red dots through it. Although that first season it may

ripen the largest peaches in the orchard and the rest of the tree may ripen too; but the next year it will not do it. Its fruit will be insipid and poor.

MR. GOODERHAM: Doctor, do you think that Commercial lime-sulphur can be kept in a barrel; kept air-tight?

DR. FUNK: Yes sir; or if it has anything to keep the air away.

MR. GOODERHAM: The barrels it is shipped in?

DR. FUNK: Yes sir.

A Member: Doctor we are troubled with a blight or disease that seems as highly destructive as the yellows. The trees are affected mostly just a little beneath the crown on the bark of the tree. The bark dies around the tree for spots of three or probably four inches.

DR. FUNK: You never notice any depression or growth there?

A Member: There is no gall there at all; positively no gall.

DR. FUNK: It would only be guess work on my part and I make it a rule never to guess.

The CHAIRMAN: Any other questions? If not we will go on to the next topic, "Fertilization and Cultural Methods for Apple Orchards," by Prof. J. P. Stewart, of State College.

PROF. STEWART: Ladies and Gentlemen: They tell us a story of a minister who went down to Yale to preach a sermon. He asked before he got up as to how long he should speak. The president said: "You can speak as long as you want to, but there is a condition around here that they make no conversions after the first thirty minutes." I am sure that I am limited in other ways in this matter of conversion.

Prof. Stewart then delivered his address as follows:

FERTILIZATION AND CULTURAL METHODS FOR APPLE ORCHARDS.

By PROF. JOHN P. STEWART, *Expt. Hort., State College, Pa.*

It is my purpose to-night to bring before you results which have followed certain orchard treatments in this State and also in others.

We have not reached our present knowledge of orchard fertilization by progress in a straight line. At first, apple trees were run on the forest plan. Fertilization was not considered. The trees were grown apparently under the impression that their demands were small and their roots were deep and hence were surrounded by virgin fertility and largely inaccessible anyhow to surface applications.

Then in 1895 came the work of Director Roberts, of Cornell, in which after a chemical study of a couple of trees he concluded that an acre of apple orchard in full bearing annually removes nearly three times (2.94) as much plant food as fifteen bushels of wheat.* Many similar studies followed,† the movement culminating in the extensive report‡ of the Geneva Station in 1905, in which the plant food constituents of all the ordinary tree fruits were given. The feeding area has also been found to be comparatively shallow, so that from these studies alone the conclusion was inevitable that a mature-bearing orchard is at least as exhaustive as any ordinary farm crop and hence should be as regularly fertilized.

Along with the chemical movement, but reported later, came what might be called a preliminary series of field trials. Fertilizers were applied for various purposes, in some cases to improve color, in others for scab, and in a few cases to affect yield. Scab and fertilizers were found to be apparently unconnected. Color showed no consistent improvement from either iron sulfate or potash. In one instance, phosphates greatly improved it,§ and nitrates, wherever reported, strongly diminished color. On yield and growth, varying results were obtained, the most consistent gains in the earlier experiments being made by nitrogen,‖ with one improvement reported from potash and none from phosphates alone. Most of the experiments comprised but few trees and were of short duration. Their effect, however, in spite of some inconsistencies, was partly to confirm the conclusions of the chemists, at least in respect to the necessity for certain elements.

Then came the reports of the long-time experiments, one in England at the Woburn Experimental Farm** and another at Geneva, N. Y.†† In them, little effect was observed from the fertilizers applied, and serious doubt was cast on the value of fertilizers in apple-production.

Affairs were in this condition, when somewhat over three years ago the experiments now in progress were undertaken by your Experiment Station at the request of your leading horticultural interests. Already some marked results have been secured, which enable us to see a little farther into the problem, and to account for some of the earlier unfavorable returns. In the meantime, favorable results from a long-time experiment in Massachusetts have appeared to which attention is given later.

---

*Amount removed in fruit, leaves and wood. Cornell Bul. 103:537-40. The statement is true if the straw is not included. Including the straw, the relation is somewhat less than twice (1.93-) the food removed by this amount of wheat.

†The results of some of these are presented by Shutt in the Canada Experimental Farms Report, 1896, 164; others in Missouri Station Rpt. 1896, P. 77; and by Browne, Jr., in Penn. Dept. of Agr. Bul. 53.

‡New York Geneva Station, Bul. 265:220. 1905.

§Experiment at Wye College, England.

‖Gains are reported from nitrogen in Cornell Bul. 153, in Mass. Bul. 66, and in Maine Bul. 139:53. In the Cornell experiment, nitrates applied on August 11, 1894 are reported to have failed to show important effects until the season of 1896, although the ground was tilled.

**Reported in 1900.

††New York Geneva Bul. 289. 1907. Nitrogen not applied.

THE PENNSYLVANIA EXPERIMENTS.

With the scope and general character of our experiments, you are already acquainted. But I would recall the facts that we have under experiment in various parts of the State ninety-one acres of orchard, forty-nine of which (including 2,219 trees) are in partial or full bearing. The yields from these experimental orchards in 1908 were somewhat over 164,000 pounds of fruit, and in 1909, the third year, they were 256,000 pounds. The data for the tables and conclusions which follow, therefore, cover a period of three years and are derived from something over 420,000 pounds of fruit. The exact locations, soil types and varieties involved are shown in Table I.

TABLE I.

Location, Soil, and other Data on Experiments away from the College.

Expt. No.	County.	Owner of Orchard.	Soil.	Varieties.	Age, 1909. Yr.	No. of trees.
215	Adams,	Tyson Bros.,	Porter's loam,	York Imperial and Stayman Winesap,	10	160
216	Franklin,	D. M. Wertz,	Mont Alto fine sandy loam,*	York Imperial and Jonathan,	10	160
220	Bedford,	Mrs. S. B. Brown,	DeKalb stony loam,*	York Imperial and Baldwin,	11 & 21	160
217	Franklin,	J. H. Ledy,	Mont Alto loam,*	York Imperial and Gano,	16	358
218	Franklin,	J. A. Nicodemus,	Hagerstown clay loam,*	York Imperial and Albemarle,	10 & 14	400
219	Bedford,	J. R. Sleek,	DeKalb shale loam,*	York Imperial, Jonathan, Ben Davis and Gano,	7	320
221	Wyoming,	F. H. Fassett,	Fine sandy loam,†	Northern Spy and Baldwin,	37	115
336	Chester,	A. D. Strode,	Chester loam,	Grimes, Smokehouse and Stayman Wine-Sap.	7–9	‡120 & 105
§337	Mercer,	St. Paul's Orphans Home,	Volusia silt loam,*	Northern Spy, Baldwin and Rome,	2	180 & 180
338	Lawrence,	J. B. Johnston,	Volusia silt loam,*	Baldwin,	21	80 & 105
339	Bradford,	F. T. Mynard,	Upshur loam,*	Baldwin and Fallawater,	15	120 & 16

*Soils un-mapped as yet but probably closest to the types indicated according to the observations of C. F. Shaw and H. J. Wilder.

†This soil has reveived no series name but it is one that has been deposited in a lake bed formed by the temporary stoppage of the Susquehanna in cutting through the mountains.

‡In the two sets of figures in this and the following experiments, the first gives the number of trees under fertilizer treatment, the second those under differing cultural methods. In experiment 339, the latter includes only a sod mulch plot.

§Trees set out in connection with these experiments, hence not yet in bearing

The first three experiments, 215, 216 and 220, comprise what we call our straight fertilizer experiments; the next four are experiments on cultural methods, with and without manures; and the last four are a combination of fertilizer and cultural methods experiments.

Each of the fertilizer experiments contains sixteen plots of ten trees each. The treatments are shown in Table II. The symbols N, P and K refer to nitrogen, phosphates and potash; and they are applied at the rates of fifty pounds N., 100 pounds P_2O_5 and 150 pounds K_2O per acre in all cases. Plots 5 and 6 compare the muriate and sulphate as a carrier of potash. Plots 11 and 12 compare acid phosphate and "floats" as a carrier of phosphoric acid (phosphorus pentoxid, more correctly). The manure was applied at the rate of twelve tons per acre and the lime at 1,000 pounds per acre. All applications are made annually.

The combined results to date of the first three experiments are shown in Table II:

TABLE II.

Influence of Fertilizers on Yield, Color and Growth.

Expts. 215, 216, 220.

Plot.	Treatment.	Yields, 1908-9., lb.	Per cent. of benefit on yield.*	Yields 1909, 3rd year, lb.	Per cent. of benefit 3d year.	Per cent. of apples colored one-half or more,† 1908-9.	Per cent. of benefit on color.	Average increase per tree in trunk girth, in inches, 1907-9.	Per cent. of benefit on growth.
1	Check,	4,643		1,306		69.2		3.29	
2	N. P.,	6,887	78.1	1,770	51.2	47.9	-22.5	3.54	8.9
3	N. K.,	5,653	82.8	1,409	36.4	57.	-14.5	3.63	19.1
4	Check,	2,313		897		72.7		3.18	
5	P. K.,	3,577	62.5	1.441	56.5	69.8	1.7	3.54	3.8
6	PK_2SO_4,	2,773	32.	1,664	76.3	67.2	3.6	3.43	5.1
7	Check,	1,998		1,067		59.		3.29	
8	N. P. K.,	3,847	67.4	1,561	31.3	41.6	-20.3	3.97	18.2
9	N.,	4,709	81.2	2,675	104.2	43.8	-21.1	4.08	19.4
10	Check,	2,898		1,431		67.8		3.48	
11	Acid P.,	2,833	6.26	2,126	52.2	69.3	3.3	3.49	-1.7
12	Raw P.,	1,548	-36.6	1.073	-21.3	75.3	11.	3.29	-8.9
13	Check,	2,209		1,327		62.5		3.68	
14	Manure,	4,793	138.3	3,423	178.5	56.0	-9.1	4.30	21.6
15	Lime,	1,538	-21-7	895	-21.	66.7	-.9	3.73	9.6
16	Check,	1,843		1,034		70.2		3.26	

*The per cent. of benefit is obtained in all cases by comparing the "normal performance" of each plot with the results actually secured, the normal being obtained by comparison with the two nearest checks.

†In all these tables the effects on color and size of the fruit were obtained from random samples, taken from the fruit of each tree as it was weighed, the aggregate sample from each plot amounting usually to one or two bushels. The data on yield and growth were obtained by weighing all the fruit and measuring all trees twice.

Striking things shown here are the strong beneficial effects of manure and of nitrogen on yield and growth, with an accompanying harmful influence on color. Plots 6 and 11 show surprising gains

in the yields of the third year. Raw phosphate and lime continue to show deficits in every way except in color for the former and in growth for the latter. We can hardly see any reason for this harmful effect in the case of the "floats" and suspect that it is due to some temporary condition which will disappear later. The same may be true of the lime effect, though the reports of "lime poisoning" made by Dr. Headden in Colorado Bulletin 131 are worthy of consideration in this connection. It is also worthy of note that the plots which have made the best yield have also made the best growth, thus showing that reasonable amounts of yield and growth are not antagonistic but rather are associated.

A puzzling condition appears in the fact that wherever nitrogen has been applied in combination with other elements, the benefit decreases in the third year, while in Plot 9 where it was applied alone the benefit in the third year increases distinctly. This is partly explainable in the larger yields of the former plots last year, thus bringing them more strongly under the operation of the biennial bearing habit.

Also the difference in yield between 8 and 9 may be traced directly to a deficit of at least 1,000 pounds that occurred this year in Plot 8 of Experiment 220. This deficit was not due to the absence of apples on the trees. On the contrary an excessive number of fruits were formed on this plot, despite its heavy crop of last year, and this very fact, coupled with the excessive foliage and extreme drought of the current season, almost prevented development in the apples. Plot 9 was subjected to similar conditions but to a lessened degree in every way. Its original set of fruit and its foliage were less and its moisture situation is scarcely as severe as that of Plot 8. The indications on the present year's crop are that the plots receiving all three elements will regain much of their loss in relative position.

In Table III we have another set of results from the fertilizer portions of Experiments 336, 338 and 339, which have been running for two years only. The applications are the same as in the experiments above.

TABBLE III.

Influence of Fertilizers on Yield and Color.

Expts. 336, 338, 339. (a) Yields in lb., 1908-9.

	1 Check.	2 N. P.	3 N. K.	4 Check.	5 P. K.	6 N. P. K.	7 Check.	8 Manure.	9 Lime.	10 Check.
1908, 1st year,	562	860	748	1,118	846	2,178	1,067	2,338	3,111	2,748
Per cent. benefit,*		15.1	-19.8		-23.2	100.9		46.7	42.1	
1909 totals,	1,087	6,435	6,367	2,502	3,803	7,212	2,436	4,600	2,349	1,720
Per cent. benefit,		312.7	213.6		53.3	193.4		109.7	19.9	
1909. (b) Color. Per cent. of apples Colored One-half or more.										
Average per cent. color.	57.2	40.-	39.8	49.4	46.5	38.0	49.7	49.0	50.3	54.8
Per cent. benefit,		-14.6	-12.3		-3.	-11.6		-2.4	-2.8	

*The results of the first year were obviously unaffected by the fertilizer treatments, but they are included for the light they throw on some of the results of the second year, uotably those in plots 2, 3 and 6.

In general these results corroborate those of Table II. The nitrogen plots show remarkable increases in yield; and the evil effects on color are less evident than in the earlier table. The lower benefit on yield in Plot 6 is due apparently to the relatively large yield on this plot the first year, coupled with a harmful influence which potash seems to be exerting in this series of experiments. Manure shows itself to be slower in action than nitrogenous commercial fertilizers. The absence of any well defined effect of fertilizers on the crop of the first year is evident here as usual. The lime again shows a very weak influence, and the relatively slight benefit that appears is probably due largely to a favorable location in one of the experiments, as explained later.

In Tables II and III we have had results from various combinations of fertilizer elements, as well as some from certain materials used singly. Those results being direct from the trees may be considered a close expression of the values thus far of the various combinations used. In many cases, however, we may wish to know which is the more active element in a given combination and approximately what values are to be assigned to each of the elements in it. For example, in Plot 2 of Table II we find a benefit of 78.1 per cent. resulting from an application of nitrogen and phosphate. Here the question arises as to how much of this effect was due to nitrogen and how much to phosphate. Any answer to this can be of course only as approximation of the truth and hence the values obtained and shown in the following table are not to be taken too literally. They are the nearest approach to the correct values, however, that we are able to obtain at this time and they were derived in the manner indicated in the footnote to the table.

TABLE IV.

*Influence of Fertilizer Elements on Yield, Color and Growth.**

Estimated Per Cent. of Benefit.

Expts. 215, 216, 220.	Yield.		Color. Growth.†	
	1908-9.	1909.	1908-9.	1907-9.
NITROGEN, in combination.	49.2%	15.55%	-19.35%	12.1%
NITROGEN, alone,	81.1	104.2	-21.1	19.4
Ave. influence of Nitrogen,	65.2	59.9	-20.23	15.8-
PHOSPHATE, in combination.	28.9	35.65	-3.13	-3.2
PHOSPHATE, alone,	6.2	52.2	3.3	-1.7
POTASH, in combination,	33.6	20.85	4.85	7.0
MANURE, alone,	138.3	178.5	-9.1	21.6
LIME, alone.	-21.7	-21.	- .9	9.6

TABLE 4—Continued.

Expts. 336, 338, 339.	Yield.	Color.
	1909 (2nd year).	1909.
NITROGEN, in combination,	236.5%	-11.9%
PHOSPHATE, in combination,	76.2	-2.7
POTASH in combination,	-22.9	- .3
MANURE, alone,	109.7	-2.4
LIME, alone,	19.9	-2.8

*The results here given are calculated or taken from Tables II and III. For example, the value of nitrogen in combination was obtained by following the formula NP+NK—PK. In other words, the per cents. of benefit obtained in plots two and three were added and from this sum was deducted the per cent. of benefit in plot 5. The remainder, divided by 2, is considered to be the value of nitrogen in the combination. The other values in combination were obtained similarly.

†Per cent. of increase in trunk girth.

These results, being derived from those in Table II and III, are naturally not materially different, but the values of the individual elements stand out more sharply.

Nitrogen and stable manure show strikingly beneficial effects on both yield and growth and characteristically harmful effects on color. The effect of manure is greatest in the third year of the first three experiments, while that of nitrogen is astonishingly great in the second year of the three later experiments.

Phosphates are showing considerable value on yield, especially when used in connection with other materials. Their effect on color and growth is apparently undecided, as three per cent. variations from the normal are attributable to limitations in our methods of determining values. Potash, in combination, has shown fairly good effects on yield and growth in the first three experiments, but has apparently proved rather distinctly harmful on yield in the second three; and considering the results in all six experiments its value in improving color is very questionable.

Lime in the first three experiments shows a distinct deficit in yield, and no advantage in color, but apparently a fair increase in growth. In the other experiments an apparent benefit in yield is shown. This, however, is traceable to an unusual increase on the lime plot of experiment 339, an increase which was due probably more to a favorable moisture situation this year than to any effect of the lime. It is surely a significant fact that in five out of six places thus far, lime shows either no effect or a distinct deficit in yield.

It will be noted that practically none of the treatments have materially improved color while a number of them have distinctly decreased it. This reduction in color is undoubtedly associated with *delayed maturity* and a *diminished light supply to the fruit,* the latter being due to an increase in the density of foliage following the application of the fertilizers. The value of sunlight in developing redness in apples is scarcely appreciated. In a test conducted during the past fall on York Imperials it was found that exposure to sunlight after picking increased the redness by over thirty-five

per cent., while apples confined in the dark, or exposed to electric light and under identical conditions otherwise, showed practically no increase. *Maturity in sunlight* on the trees is undoubtedly the great influence affecting the red color of fruit, and when soil ingredients apparently affect it, the result is doubtless produced indirectly through a modification in the main influence.

In Table V, we have the "dollars and cents" value of fertilization as shown in some of our most striking results of this year.

TABLE V.

Financial Value of Fertilization.

Expt. 221, 1909 (3rd Yr.)	Yield, pound.	Bushels, per acre.	Value at 50 cents.	Cost of fertilizer.	Net gain per acre.
Unfertilized, plots 4 and 7,	19,448	194.5	$97 25		
Com. fertilizer, plots 6 and 9,	47,028	470.0	235 00	$13 00	$124 75
Manure, plots 5 and 8,	48,550	485.5	242 75	15 00	130 50
Expt. 220, 1909 (3rd Yr.)					
Unfertilized, plots 13 and 16,	291	27.9	13 95		
Manure, plot 14,	1,947	373.8	186 90	15 00	157 95
Expt. 338, 1909 (2nd Yr.)					
Unfertilized, plots 1 and 4,	2,607	156.4	78 20		
Com. fertilizer, plots 2 and 3,	12,026	721.5	360 75	15 00	267 55

It is to be noted that the net gains are obtained after *deducting both the cost of the fertilizer and the value of the unfertilized crop.* Also the fruit here is valued at fifty cents per bushel, while the actual prices received for it varied from fifty cents to $1.25; and any increase in the appraisement of the fruit of course will proportionately increase the net gain. It is also to be noted that spraying and pruning produced no material effect on the *size* of the crop, since the treatment of all plots in these respects was uniform.

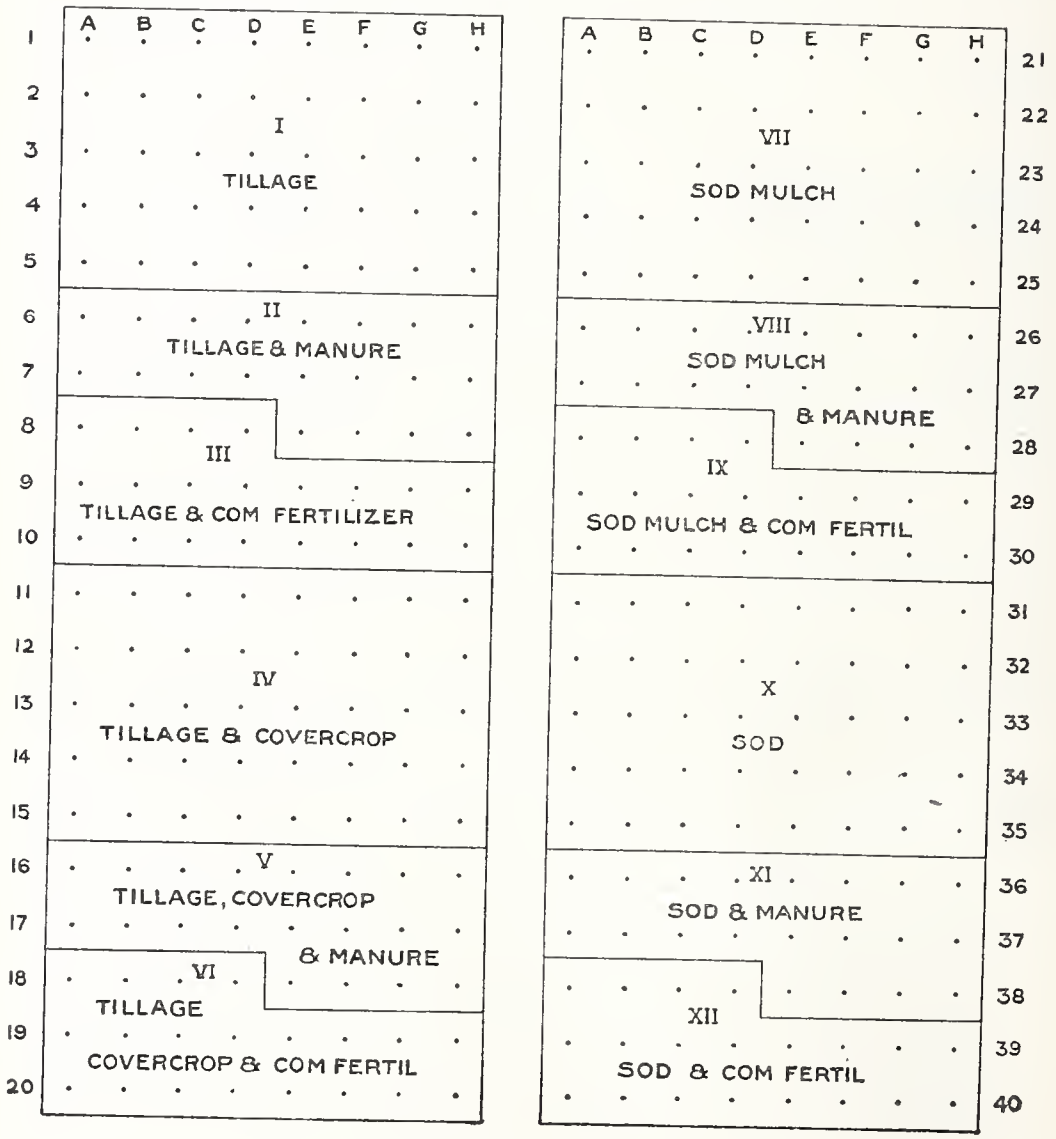
Such striking results as these of course are not to be expected everywhere. They evidently occurred here because plant food was the crop limiter in these orchards. For any given case this can only be determined by experiment. These orchards are on three diverse soil types. The soil in one case was evidently "run down;" in another case it was in average condition; and in the third it was apparently above the average. These orchards are from twenty-one to thirty-seven years of age and they are the only ones under experiment above twenty years. Age, however, is not a sure index

of the need of plant food, as one of our youngest orchards, a seven-year old, is responding strongly to fertilization, while some older ones have proved unresponsive. The big fact is that when such results as these are obtainable anywhere, it raises a strong suspicion that similar benefits may be obtained in many other orchards. And these results show beyond preadventure that in some orchards, apple trees, like other plants, respond strongly and directly to applications of plant food.

EXPERIMENTS ON CULTURAL METHODS.

Closely associated with the question of plant-food, is that of soil moisture. It is undoubtedly the available moisture per individual fruit that determines in a large measure whether or not the apples shall attain their proper size; and it is largely to modify moisture supply that the various cultural methods are followed. The plan of our experiments comparing these methods is shown in Figure I.

Figure I.



PLAN OF EXPERIMENT ON CULTURAL METHODS AND MANURES.

As shown in the figure, this experiment tests four methods of soil management, viz., clean tillage, tillage and cover crops, sod mulch, and sod. Each treatment occurs both without fertilization and with it. The stable manure is applied annually at the rate of twelve tons per acre; and the commercial fertilizer at the rate of thirty pounds of nitrogen (N), sixty pounds phosphorus pentoxid (P_2O_5), and 100 pounds of potash (K_2O).

On the mulch plot all herbage remains in the orchard, the first cutting being raked to the trees as a mulch, and an additional mulch of old straw, swamp hay or buckwheat straw at the rate of about three tons per acre is applied annually. In this latter respect it differs from the so-called "Hitchings plan," and as a conserver of moisture it is undoubtedly very much better than that plan. On the sod plot, the first cutting of herbage is removed from the orchard and the second is left where it falls. The tillage plots are all cultivated until early in July, when those receiving the cover crop are seeded to crimson clover, hairy vetch or medium red clover and alsike, either singly or in combination. The results to date are from the unfertilized plots of the young orchards, and are shown in Table V. These results and those in later tables on young orchards have been obtained by combining the data from three orchards, whose age as noted in Table I ranges from seven to sixteen years.

TABLE VI.

Effect of Cultural Methods on Yield, Color, Size and Growth, without Fertilization.

Expts. 217, 218 and 219. Young Orchards. (a) Yield.

1907–9.	I. Clean tillage.	IV. Tillage and cover crop.	VII. Sod mulch.	X. Sod.
Totals, 3 yr.,	15,048 lb.	16,057 lb.	17,776 lb.	13,880 lb.
Ratios,	108.	115.7	128.1	100
	100	106.7	118.1	
		100	110.7	

1909. (b) Color. Per cent. Apples Colored One-half or More.

Average per cent.,	75.4	81	81.5	85.6
Ratios,	100	107.4	108.1	113.5

1908–9. (c) Size. Average Weight of Apples.

Average weight,	4.5 oz.	4.74 oz.	4.91 oz.	4.69 oz.
Ratios,	100	105.3	109	104.2

1907–9. (d) Growth. Increase in Trunk-girth.

Average increase,	4.38 in.	4.14 in.	4.29 in.	3.58 in.
Ratios,	122.3	115.6	119.8	100
		100	103.6	

In these results, the mulch system is first in yield and size of apples, second to sod on color, and second to clean tillage by a slight margin or growth.* It has surpassed the cover crop method on every phase and in total ranking is plainly first thus far in the combined results of this group of experiments. Reserving judgment on the relative merits of these systems for the present we may turn to consider the data from a similar experiment in an older orchard—that of Mr. Fassett, in which the trees are now thirty-seven years old. The results from the unfertilized plots in this orchard are shown in Table VII.

*The margin is really slighter than appears in the table, as the 1909 measurements in the mulch plot of experiment 218 were taken a little higher on the trunks than those of 1907, owing to the presence of screen on the trees at the later date.

TABLE VII.

Effect of Cultural Methods on Yield, Color, Size and Growth, without Fertilization.

Expt. 221, Mature Orchard. (a) Yield.

1907-9.	IV. Tillage and cover crop.	VII. Sod mulch.
Totals, 3 yr.,	34,269 lb.	23,294 lb.
Ratios,	147.1	100

1908-9. (b) Color, Per Cent. appres Colored One-Half or More.

Ave. per cent. of color,	57.4 %	87.5 %
Ratios,	100	152.4

1908-9. (c) Size, Average Weight of Apples.

Average weight,	4.75 oz.	5.04 oz.
Ratios,	100	106.1

1907-9. (d) Growth, Increase in Trunk-girth.

Average increase,	2.9 in.	1.32 in.
Ratios,	219.7	100

In the above results it will be noted that in the mature orchard, tillage and cover crop for three years has been far superior to sod mulch in yield and growth, having borne nearly one and a half times as much fruit and showing more than double the increase in growth. In color, the mulched fruit excells by more than thirty per cent;* and in average size of apples it excells by about six per cent. This last fact is undoubtedly connected with the smaller crop on the mulched trees.

The results of Tables VI and VII are apparently contradictory. They are all explainable, however, on the bases of soil moisture and age of trees. In the young orchards, with the herbage and three-ton addition of straw, an effective mulch of sufficient extent was maintained, while in the old orchard we were unable thus to cover more than probably half the root area. In the latter case the term *sod* mulch was distinctly appropriate since at least the outer half of the roots was under a typical sod and often in dust-dry condition.

*Really the mulch excels in color by 52.4 per cent., using the amount of color on the cover crop area as a base.

The results in Table VI indicate that, even in trying seasons such as the last two have been, the moisture in orchard soils may be conserved at least as effectively by a good mulch as by tillage. This conclusion is corroborated by moisture determinations made by Shutt, of Ottawa, Canada, in 1905 and 1906.† He also has found that leguminous plants, particularly those of dense and matted growth like hairy vetch, are much less severe in their drain on soil moisture than the grasses; and that the shade of the growing vetch is a better conserver than the mulch formed by cutting and leaving it in place. In other words, the loss by capillarity and surface evaporation from the practically bare ground was greater, under the conditions at Ottawa, than the transpiration through the legume.‡ The cover on our mature orchard is grass only, while on the young orchards a scattering growth of alsike or of medium red clover has been maintained in addition.

In further explanation of the difference in effectiveness of the mulch and cover-crop methods in Tables VI and VII, we may call attention to the hastening influence on bearing, which sod undoubtedly exerts under favorable conditions. This was shown in our results of last year,§ where sod on these same three orchards surpassed clean tillage in yield by thirteen per cent. It is also shown here later, especially in the sod-manure plot of Table IX. But the fact that this sod influence can be easily overdone and made to disappear under unfavorable conditions, is clearly shown in our results from the unfertilized sod plots of Table VI.

The next table shows the *effect of adding fertilizers* to the four cultural methods. All unfertilized plots are excluded from this table, and the yields given include both the manured and commercially fertilized plots under each method.

TABLE VIII.

Influence of Cultural Methods on Yield, with Fertilization.

Expts. 217, 218, 219. Young Orchards.

	Two and three, clean tillage.	Five and six, tillage and covercrop.	Eight and nine, sod mulch.	Eleven and twelve, sod.
1908, yields,	9,193 lb.	9,512 lb.	11,203 lb.	10,351 lb.
1909 yields,	14,554	12,443	12,571	12,823
Totals,	23,747	21,955	23,774	23,174
Ratios,	108.2	100	108.3	105.6

Expt. 221, Mature Orchard.

1908 yields,		6,684	10,351	
1909 yields,		28,297	22,545	
Totals,		34,981	32,896	
Ratios,		106.3	100	

†Central Experiment Farm. Report of the Chemist. p. 151, 1906.
‡Ibid, 1904, p. 158.
§Pa. Bul., 91:15, 1909.

As compared with Tables VII and VIII, these results show a marked leveling effect from addition of fertilizers. In other words, the applications of plant food have tended strongly to reduce or even nulify the differences due to cultural methods. This effect was also very distinct in the appearance of the trees in the field.

A consecutive increase in productiveness following the addition of plant food has been very marked in some cases. For example, the mulched plots of Experiment 221, receiving manure and commercial fertilizer, in 1907 produced 3,050 pounds of fruit; in 1908, as seen in the table, they produced 10,351 pounds; and in 1909, 22,545 pounds. And this occurred on plots receiving no tillage.

FERTILIZATION FOR DIFFERENT CULTURAL METHODS.

The question often arises as to what is the best form of fertilizer to accompany different cultural methods. This question is partially answered by the data in Table X.

TABLE IX.

Effect of Manures on Yield.

Expts. 217, 218, 219.

Season 1908-9 (2nd and 3rd Year).	Unfertilized.	Stable manure, 12 tons per acre.	Com. fertilizer, 30-60-100 lb. per acre.
Clean tillage,	13,698 lb.	21,605 lb.	23,022 lb.
Tillage and cover crop,	14,550	20,582	20,681
Sod mulch,	15,702	23,678	20,408
Sod,	11,706	24,772	17,929
Totals,	55,656	90,637	82,040
Ratios,	100	162.8	147.4
		110.5	100.

Expt. 221.

Tillage and cover crop,	33,119	31,924	35,502
Sod mulch,	21,091	35,396	28,370
Totals,	54,210	67,320	63,872
Ratios,	100	124.2	117.8
		105.4	100

This table shows the influence of fertilizers on yield when used in connection with different cultural methods. It will be observed that in every case except one, the yields from the fertilized plots have surpassed those from the unfertilized. And in the one exception the yields on the corresponding fertilized plots this past year were more than double the yield on it. In total effect, con-

sidering all treatments, the fertilized plots show a distinct increase over the unfertilized; and stable manure at the rates applied shows a small gain over chemicals.*

Examining the data still more closely, we see that in every case on the tilled plots commercial fertilizer has surpassed the manure, while on the untilled plots the reverse is true. In other words, the present data indicate that, from equal values of manure and of a proper commercial fertilizer the best results are obtained by using the manure on sod or mulch areas, and reserving the chemicals for use in connection with tillage. Either material, however, may be used satisfactorily and it is very probable that in any case a more or less regular alternation can be made more successful than either alone.

TABLE X.

Effect of Manures on Color, Size and Growth.

A. Expts. 217, 218 and 219. (a) Color. Per cent. Apples Colored One-half or More.

	Unfertilized.	Stable manure.	Com. fertilizer.
Average per cent.,	71.2 %	61.9 %	62.4 %
Per cent. benefit,		-9.3	-8.8
(b) Size. Average Weight of Apples.			
Average weight,	4.71 oz.	4.99 oz.	5.25 oz.
Ratios,	100	106	111.5
(c Growth. Increase in Trunk-girth.			
Average increase,	4.12 in.	4.3 in.	4.43 in.
Ratios,	100	104.1	107.5
		100	103

B. Expt. 221. 1908-9. (a) Color. Per cent. Apples Colored One-half or More.

Average per cent.,	72.5 %	68.1 %	73.5 %
Per cent. benefit,		-4.4	1.
(b) Size. Average Weight of Apples.			
Average weight,	4.89 oz.	5.42 oz.	5.33 oz.
Ratios,	100	110.8	109.
(c) Growth. Average Increase in Trunk-girth.			
Average increase,	4.22 in.	5.86 in.	4.92 in.
Ratios,	100	139	116.6
		119.1	100

*More plant food is being furnished by the manure, since twelve tons of average stable manure are estimated to contain about 120 lb. each of nitrogen and potash (K_2O), and about 80 lb. of phosphoric pentoxid (P_2O_5). The relative cost per acre, as applied, is about $15 for the manure and $13 for the commercial fertilizer, outside of the cost of application.

Table X shows the effect of manures in both young and old orchards on color and size of fruit and on growth of trees. The effects have been fairly distinct in all cases,—reducing the color with one exception; and apparently increasing size of fruit and tree-growth.* In all cases, the color is least on the plots receiving stable manure. In the old orchard, manure shows some advantage over commercial fertilizer in wood growth and in size of apples, with effects reversed in the young orchards. The greater effect of commercial fertilizer in the young orchards is probably connected with the smaller area over which it is distributed, thus giving relatively stronger applications.

The above data are obtained from extensive work through a short period. In Table XI, we have data from the reverse conditions,—one experiment continued over twenty-one years.

TABLE XI.

Massachusetts Experiment on Apples, 1889-1910.†

Treatments and Total Yields per Acre, to Date.

Plot.	1	2	3	4	5
Annual Treatment.	Manure, 10 tons.	Wood ashes, 1 ton.	Check.	Bone & K Cl, 600 & 200.	Bone and low G. sulfate, 600 & 400.
Ave. girth,	38.25 in.	33.23 in.	27.98 in.	32.27 in.	37.02 in.
Ratios,	136.7	118.8	100	115.3	132.3
Yields, lb.,	24,934	12,841	3,940	14,453	21,863
Ratios,	632.8	325.9	100	366.8	554.9
Color and size,	4	1	5	3	2

These results are similar to those recorded in the preceding tables with the differences in some cases even more distinct. In every respect the treated plots have proved superior to the untreated. The manure plot, which alone receives nitrogen in quantity, leads in yield and growth but falls next to the check in quality. It is closely followed in yield and growth and much surpassed in quality by Plot 5, which received ground bone and low grade sulfate of potash. The superiority of 5 over 4 which differs only in the carrier of the potash is very interesting. Whether it is due to the magnesia in the sulfate or to a harmful effect of the chlorine ac-

*We say "apparently" increased the size of fruit, since the matter of size is undoubtedly primarily dependent on soil moisture and number of fruits on the tree. Thus any fertilizer effect must necessarily be indirect, as in the case of color.

†Data furnished by Director Wm. P. Brooks, of the Mass. Exp. Station, December, 1909.

cumulating from the muriate, or to a soil difference, cannot yet be stated. It will be recalled that our results of the third year corroborate it, in plots which compare only sulfate and muriate.

The practical point, however, is that with such differences as these existing even the over cost is small, and if so desired it can be readily met by a reduction in the amount applied. This would be justified by our present results, which indicate that the usual recommendations of potash for orchard use may be reduced to advantage.

CONCLUSION.

In general, the whole question of orchard fertilization may now be regarded as dependent on the limiting factor or need. The productiveness of an orchard depends not on one but on a *number* of factors, among which are location, varieties, spraying, and other care. These factors are all bound together so that improvement in one may at times indirectly benefit the whole, yet in the long run it is the weakest factors that control the crop and through them only that it can be materially affected. This means that the usefulness of a fertilizer depends entirely on the need. Fertilization is profitable, where plant food is the limiter. But where something else is the first need and therefore is doing the limiting, it must evidently be brought up before fertilization can have any material effect.

In the same way, it is evident that it is useless to apply potash alone where nitrogen or phosphates are required. And it is also probably less effective to apply any transient or quickly available fertilizer much in advance of its most active seasonal need.

The problem before the orchardist therefore is one of determining limiters, raising them to the level of the other factors, and thereafter maintaining a balanced treatment of the whole. The determination of limiters is easy in most cases; but with plant food and cultural or moisture requirements it is done with certainty only by trial.

The CHAIRMAN: Is there anything further to-night?

DEPUTY SECRETARY MARTIN: Nothing further than call attention to the program for to-morrow morning. Promptly at 9.00 o'clock the subjects will be changed. "Profitable Breeding and Feeding of Beef Cattle," will be the subject of the first address by Mr. O. E. Bradfute, of Xenia, O.; then we will have "Beef Cattle; Their Relation to Agriculture in Pennsylvania," by Prof. W. A. Cochel, of State College, Pa., and the concluding topic will be "Control of Infectious Diseases of Animals," by Dr. S. H. Gilliland, State Veterinarian, Harrisburg, Pa.

This session, as I have stated, will convene at 9.00 o'clock to-morrow morning. We are invited to be at the entrance to the Court House at 8.00 o'clock to-morrow morning in order to make a visit to the plate glass works in this city. I believe there is nothing more.

The CHAIRMAN: If that is all, we will adjourn the meeting until to-morrow morning at 9.00 o'clock.

Wednesday Morning, May 25, 1910.

Mr. W. C. Black in the Chair.

The CHAIRMAN: The whole Normal Institute, tail and all, went over to the glass works and we are late in getting started, so will proceed at once. Secretary Martin wants to make some announcements.

SECRETARY MARTIN: It has been our custom at these meetings to have a Committee on Resolutions. At every annual meeting we receive the sad intelligence of the calling away during the year past of some one or other of our members. This year has been no exception to that, and considering the loyal and liberal manner in which the citizens of Butler and Butler county have arranged for our entertainment, a Committee on Resolutions is in order, and hence, we will appoint the following members of the Institute to constitute that Committee: M. N. Clark, of Westmoreland county; W. E. Perham, of Wayne county; Sylvester Shaffer, of Lawrence county; A. J. Kahler, of Lycoming county; Dr. M. E. Conard, of Chester county; W. A. Crawford, of Venango county, and L. W. Lighty, of York county.

Our Annual Institute Bulletin has become an established publication of the Department, and since our New Castle meeting, when we had a photograph taken of the entire assembly, I find a demand for certain illustrations and photographs, and we are arranging to have taken for this meeting and for our bulletin a photograph of our corps of lecturers, both the lecturers for this occasion those that are from other States, as well as the regular corps of lecturers taken together, and then a photograph of the County Chairmen of Institutes. He is about the biggest one we have and, of course, he is the man on the ground in the different counties. We want to have these photographs taken in front of the Court House immediately after adjournment to-day, at noon; so the lecturers, after adjournment, will please assemble on one side and their photograph will be taken, then the County Chairmen of Institutes will assemble at the same place for their photograph. I make this announcement now, in order that no one will forget to get into position promptly at that time. We want to have one or two other photographs taken, probably one of the Women's Session here in order that we may have that in our annual bulletin.

My secretary is here, and as we have quite a number of County Chairmen who are entering upon the work for the first year, I have no doubt there are many questions in their minds as to the manner of procedure and just what to do. Now, at one o'clock my secretary, Mr. First, will be here and if there are any of these Chairmen or any others who have questions they would like to have answered and explained, you will find him here for that purpose. It may be the means of helping you in arranging for the institutes for which you will have to arrange within the next two weeks. That is all I have to say for the present.

The CHAIRMAN: In looking over the program this morning, it seems there is a surplus of "meat" in the topics. and those who are to discuss them. We have first, on the program, a gentleman

who is a junior member of a firm that is breeding cattle, one of the principal breeders in the State of Ohio. This gentleman has been connected with the National Stock Show in Chicago as an officer and has been a prominent exhibitor at that show for many years. I am not going to take the time to repeat the successive winnings there. On the farm where this gentleman is operating, he and his forebears for eighty years have been breeders of cattle. This gentleman comes to us to tell us of his experience, and the very first word in the title is that of profit. That is the crucial test of the whole business. Without further remarks, I will introduce to you the Hon. O. E. Bradfute, of Xenia, Ohio.

PROFITABLE BREEDING AND FEEDING OF BEEF CATTLE.

By O. E. BRADFUTE, *Xenia, Ohio.*

I possibly run some chance of duplicating what I may have stated at Harrisburg a couple of years ago with reference to beef cattle. However, I would rather duplicate than fall into the error of telling a different story. The one who has been successful along any line is hardly able to tell a very different story in regard to that success. So if any of you were present at Harrisburg when I spoke there and hear much of the same thing, you will have to content yourself with hearing the same experience twice.

I talk to you with reference to the profitable breeding and feeding of beef cattle. Beef cattle have not been prominent in Pennsylvania. As you well know the tendency of beef production has been westward continuously for a large number of years. But as the West has filled up and the large ranges have been cut up into farms it is becoming a question more of farming in the West. The tendency of the beef cattle production is again eastward because the process of making beef in the West is becoming more and more expensive. Eastern farmers were driven out of the business largely because it was not profitable. The matter was so much more simple in the West and the expense was so important an item that it made it almost impossible for eastern breeders to compete against the western breeders of beef cattle. I am not altogether sure that we have yet arrived at the period when we can say that the breeding grounds for beef cattle can be moved to the East. I may simply say that the tendency is again eastward; and this is very natural because the people who eat the best beef are the eastern people. There are no people so well located for the market of the people who eat the best beef as the people of Ohio and Pennsylvania. I understand very well that Pennsylvania has large dairy interests, and naturally so, because a good many people who consume these things are here in the State, therefore it is necessary for you to produce those things which pertain to the dairy. And so, the breeders throughout Pennsylvania are, of course, more conversant and have made quite a study of the problem of dairy feeding and breeding.

The problem of breeding beef cattle and the feeding of beef cattle is not different particularly from that of the breeding and feeding of dairy cattle. You will find, I think, that it will require the same amount and the same character of brains to make a success in the one that it will in the other. If any man thinks that he can successfully produce beef cattle in a haphazzard, easy way, without any expense and without any effort, I plead with him not to undertake it and expect to be successful. There is nothing that is worth attaining that comes without great effort.

As it occurs to me, the problem you will have to deal with more than any other, is the character of the cattle that you are going to breed and feed. The people to whom you will sell demand the best. They are not satisfied with ordinary beef. They can afford to buy the best. They have the money with which to pay for it and it becomes the business of the farmer to satisfy that demand. That demand is not one which is decreasing, but one which is increasing. Now when you stop for a moment and think you realize that everybody in this country wants to eat loin stake and the choice cuts of the beef animal. Nobody seems to be content with the flank steaks and with the inferior parts of the beef animal. Permit me to say that that is one of the things that enters into the high cost of living—that everybody wants to eat the superior parts of the animal. Now we have this with which to contend: about two-thirds of the value of an animal, as it hangs in the butcher shop, is contained in a little over one-fourth of that carcass; about sixty-four per cent. of the value of that animal is contained in about twenty-eight per cent. of that carcass. Now, I don't think that I need say very much more to convince you of the high importance of having animals that have large proportions of these particular cuts, of the high priced selling cuts, because these are the parts that are wanted by the people, and it seems that everybody is willing to pay for that kind. Now if we intend to breed beef cattle, it is therefore important that we select a type of animal that will produce in the greatest abundance those particular cuts of beef. I am not here to plead in behalf of any particular breed of cattle. There are a number of breeds anyone of which will give you success along that line. I need only to name at least three of them,—the Shorthorn, the Hereford and the Aberdeen-Angus. That it is possible to make as great a gain on perhaps some of the steers of the dairy breed as it is on the steers of the beef breed,—I am not going to contend that it is not. There are men who have made a good profit feeding inferior cattle, buying in low condition, at a low price, feeding them up to a good stage and selling them at a considerable advance over the price they cost. That is a profitable method. But that side of it does not particularly appeal to me. I am one of those who look not only to reaping a profit out of a thing, a financial profit, but the profit of satisfaction as well. The profit of having said that you have done a thing well; that you are producing the best that can be produced, if you please; profit that comes from having produced a top notcher. I am not saying that profits are not made from inferior steers or animals, but I do contend that there is not only a financial profit but other profits as well that come to the men who are breeding better steers and that cater to the better markets in our great cities and to the better class of people.

Now, I am well aware that perhaps not many in Pennsylvania have the foundation cow, from which they can grow this class of cattle. There are some,—I know some splendid breeders of beef cattle in Pennsylvania. You have not the number that you had years ago when Washington county was prominent in this beef breeding. You don't so often hear of some community in Pennsylvania taking high rank as they did sixty years ago. When I was a boy I was always taught that one of the headquarters of pure bred stock of several kinds was in one of the counties in this State, Washington and one or two others. Of course, you have your great feeding grounds, particularly in the eastern part of the State where some very fine cattle are very profitably feed. But the problem will come, perhaps, in building up a herd of beef cattle with the foundation which you have. Now I want, in as far as possible during this talk, to confine myself to the simpler things along cattle lines, not the complex but simple problem that will come up constantly before you and the first proposition is getting your herd established, your beef cattle herd. How shall you do that? Perhaps you have practically no cows of a proper beef formation. Your neighborhood practically has no cows that are the proper type upon which to build a beef foundation. Can you afford to sell the cows which you have and go to the West and bring in cattle more of the beef type and start your herd along that line. That is a question which every farmer will have to answer largely for himself and under his own conditions. He knows what he has if he knows beef cows.

Now I am going to say this to you,—there are many of you older than I,—but it has been the surprise of my life to see men that have been breeding cattle all their lives who are not able to distinguish why one steer is particularly better than another. A number of years ago an old gentleman in my own neighborhood, a very intimate friend of mine, had a bunch of very good steers and we were feeding a bunch of steers. A buyer came along, and offered us a cent a pound more than he would offer him. The old gentleman came to my house and looked over the cattle and said he could not see why that man would give us a cent more than him. He said, "Mine look just as good as yours and as fat." Probably they did. He had not learned to distinguish the type that the markets demand. And so I say to you that if you are going to start in the beef cattle business, one of the first things you will have to do is to get the type clearly fixed in your mind, just as the man who takes a block of marble to cut out a figure has the ideal in his mind all the time. He has seen in the block of marble just what it is to be like when finished. And so the man must see in the animal which he is going to form into beef just what character of animal this is going to be when finished, and when finished it must be of the type that is in demand, that the people want. Now I know of no better way, if you are not familiar with this type, than to go to the great shows in this country, such as State Fairs and great Beef Shows and study those types. I am not going to say that we are not in danger of overdoing it in following along the lines of certain types. There are men breeding dairy cattle who are perhaps paying more attention to the type of the animal than to performance, but with beef cattle the finished animal or what he is going to produce in beef, and therefore the type has very much to do with the character

of the animal; so that you will have to have some means to learn the desirable type of the beef animal and then when you have once found out you will have to stick to it. There are so many men all over this country that put one so much in mind of the dog chasing the rabbit down a lane. Just about the time the dog gets hold of the rabbit he slips through the fence and the dog has to go to the trouble of jumping over in order to follow the rabbit, and just as he again about catches him, again through the fence he goes. Now there are many men in our country that are playing that same game with beef and dairy cattle. Just about the time they get a good herd of dairy cows and things are beginning to do pretty well, the bottom has dropped out of their market and it looks from the other side as if beef is more profitable and so he misses his rabbit. He jumps over the fence into the beef column and he starts for beef for a while, and when he gets his herd up to the beef standard he finds the beef is not worth very much. Butter is worth thirty to forty cents and beef only $3.00, and he tries to jump over the fence again, and thus he spends his entire life doing that thing. This country is full of men who have spent their lives doing that thing.

Now life is too short to jump over that fence too often. We cannot afford to do it. Then we have people that have tried to get over the fence by the dairy bull or beef bull. That is one way of getting over the fence if you undertake to do it. I can ruin the best dairy herd in the land in less than two crosses with a beef animal. I can do it with one cross; I can ruin the best beef herd in the land with one cross of the dairy bull. With about three crosses you can get into fairly good results but not the best. Now someone will say, why not select a general purpose animal, so when beef is high you can make beef and when dairy is high you can make butter. Well, you can. Many men do do that but I do not recall one who is making a distinct success in either line by doing it. We find men content with small things, with the ordinary things. You have an ordinary animal. You produce only an ordinary amount of butter and only an ordinary quality of beef, but I believe that what is worth doing at all is worth doing well. If I want to grow beef I want to do that, but if I want to make butter I want to make butter. When I think of the general purpose cow—I cannot help but think of two ladders set up in the form of a "V." I once saw a trick performer have a little dog put his hind feet on the rung of one ladder and front feet on the rung of the other ladder and thus work up to the top of the ladder, but they don't do that way in the cattle line. They are set up in the form of a "V" and not an animal has been produced that can put its hind feet on the top rung of the one and the front feet on the top rung of the other ladder. When he gets half way he has reached his limit. And that is the way with the general purpose cow. We get half way up the ladder. If content with being half way up the ladder perhaps that is the cow for you to raise. But I do not believe there is a young man in the country who ought to be content with getting half way up any ladder. This is the age of young men and the young man who is going to succeed must stick to one thing. We cannot make great success and reach prominence in a few years. In many things it takes more than one generation to accomplish satisfactory results, and

so I say if you are going into beef cattle go into it as if you mean to stay in it. Of course, if you do not succeed, you can sell out and commence anew in your dairy line if you wish, but don't try crossing back and forth and expect to reach success.

Now if you have a class of fairly good beef cows, by purchasing a bull, one with prepotent tendency, especially productive in beef, you might succeed in three generations of cattle life in producing a fair class of beef cattle. I am not here advocating generally the use of pure bred animals for the making of this beef nor of extremely high priced animals. I do contend that the man who is content with any sort of a bull which he may pick up, without knowing anything of his antecedents, and undertake to build up his herd on that foundation, will probably fail. It will interest you to know that we at our place have been able to sell time and again to men who have not a single pure blooded animal on their farm but simply grading up their herds to a good beef type, numbers of bulls for $200 to $300 apiece. Many men come to our place and say, "I cannot afford to buy a high class bull. I am not breeding pure bred stock." I am not so sure about that. The men who have topped the markets year after year in Chicago are not using $50 bulls; and the men who are topping the records along dairy lines are not using inferior bulls. If you are going to succeed with either you will have to have sires that will do what you want them to do, produce the type you want to produce, that are prepotent along their lines. And so I say if you have cows of a fairly good beef type, by buying a bull of that sort and placing in your herd you may be able to produce high class of beef cattle. The cattle which have won year after year in Chicago at the great show (car load lots), have not been pure blood cattle, only a few groups in them have been pure blood; largely they have been high grade cattle, very often the crossing of two different breeds, particularly with reference to the Shorthorns and Angus, the crossing of the one with the other. We have all looked as if they belonged to the one breed and were not a few crossings of the two breeds. And so I say, breed to a good sire to get a good foundation. Select a sire of a particular type, or that character of animal, and then build up your herd with that foundation and go on to success.

Now I think we might turn our attention to the handling of our herd along beef lines. There are many who are discontented with dairy cattle on account of the labor required. It is that constant every day work that never lets up, seven days in the week, morning, noon and night. These cows must be attended to. The man who does that must be there all the time. I don't want you to feel for a moment that if you are to succeed in beef cattle that you can do so and not give it personal attention. It will require personal attention just as the dairy requires to make it a success on the part of the same competent man. But the attention is not so intense because following up the line which I have mapped out briefly, there are seasons when we have but little work to do with them. For the next three or four months the man who is in the beef cattle business, through the grazing period, will find himself able to take considerable rest while he can see the results going on. He does not have to be there morning and night as promptly as the cow is. And therefore many men are preferring to take up the beef in-

dustry simply because there is more of a rest connected with the beef industry than with the dairy industry. He has his rest days and lax months which seem never to come in the dairy business.

It is desirable, if possible, in beef cattle if you are going to breed your own calves, to have them born as nearly as possible at the same period of the year in order that you may have them all about the same age and the same size. It is just as easy to handle ten, fifteen or twenty calves as it is to tend to two or three, and if you have them all together it is a very simple matter to feed, just as with dairy calves. On the other hand if you want to keep some cows for milking, it makes a flood and then again you are without it. You will find that objection. If you are not going to use any of the milk it will pay you to have one or two dairy cows that you use for your family dairy and you have them the year through. I am going to advocate as largely as possible to let these little fellows nurse their dams. I have seen fairly good calves raised by hand and some fed with separator milk but never as good ones as with the other process. It is more expensive to raise them with their mothers. Indeed you have to figure closely if you can figure out how to keep a cow a year to grow a calf; but all that you shall have to find out in the growing of beef just as in the dairy, that there are many little profits, little turns of business that cannot easily be put down on paper, that you cannot readily see. There are many things on your farm that may be consumed to advantage by your beef cattle and hogs. So I say I think the better calves are produced by letting them run with their dams, and if you have good cows many will raise two calves. I have known of farmers in the pure blood business who, instead of having two calves to one cow, have two cows for one calf. That is not profitable beef production. That is feeding to win. That is feeding for the show and it is necessary to do it that way if you are going to win, but those animals, individual animals, are not been fed at a profit. They are fed to win.

Begin to feed your calves as soon as possible. Within fourteen days after they are born you can give them a little grain. Now every day a calf lives in which it does not make a gain it is so much loss. As Mr. Kerrick, of Illinois, would say, you grow beef; don't fatten beef, but grow beef. Start with him as soon as born and make him into a beef animal. Make every day count. With the beef animal brought up until 1,500 pounds, the first 500 pounds of that animal is the cheapest, the second 500 pounds the next cheapest in production and the third 500 pounds you need to be careful if you do it at a profit; so then make your animal early. The animal is practically made the first twelve months of its age. Begin right there and push, push him along. Never let him rest from his labors. Calves over fourteen days old we begin to feed shelled corn. Sprinkle a little corn in a low trough and step out of the pen and you will be astonished to see how soon they learn to eat that corn. Almost immediately one calf goes up and makes a beginning and the others follow. Just a little the first feed, feed him scantily.

A Member: Why do you prefer shelled corn to corn meal or ground corn?

MR. BRADFUTE: I don't know that it is any better for him but the calf thoroughly digests the whole corn. He grinds it and so enjoys the grinding of it, that I hate to rob him of the pleasure. It saves the expense of five cents a bushel. He thoroughly grinds it himself and thoroughly digests it and so I let him have the pleasure of doing it himself.

After a little while we add a few oats. I don't know that you can grow corn and oats on your farms to success. I am not going to lay down hard and fast lines that you have to follow because I have long ago learned that when you undertake to apply fixed rules to any line of agriculture you are up against something and you don't know what is going to happen. You say a thing cannot be done and about ten minutes afterwards a fellow gets up and says he did it. I am not going to say you cannot feed this or that because I am likely to find the man who says he did it. I am simply giving you our experience in doing these things. If you find that you cannot get these kinds of feeds, your experience along dairy lines teaches you that you can use other kinds of feeds for the feeding of dairy cattle is not different from the feeding of beef cattle. You will have to exercise your own judgment as to whether or not they are balanced. You will have to figure those things out with what you can produce upon your own farms and so we cannot lay down hard and fast rules. I believe the farmer, as a rule, who makes the most profit is the man who feeds the produce of his own farm, or exchanges that produce for some of equal or more value, but every exchange or move you make adds to the expense. In all your work with beef cattle, remember that simplicity should be the rule. Whenever you begin to dabble in complicated methods, complicated feeds, you are getting an expensive thing on your hands. The method I am going to advocate is simple and perhaps unfashionable on the part of many men, but it has been satisfactory and profitable with us.

I like to keep the calves away from the flies if I can. Flies have become a serious problem with beef feeders just as with dairying. The experiment station men will do a great thing for this country when they show how to get rid of the flies. They will add dollars to the beef and dairy interests of this country when they solve that problem. It will pay to keep the calves where the flies don't disturb them, a darkened shed during the day time and then they can graze during the night or days when not disturbed.

We like to have our calves come in the Fall rather than in the Spring. By having them in the Fall or early Winter and in the stable we have them under our eyes all the time and we see that they properly nurse their dams. We don't let the calves run with the cows. We put them to the cow and put them back. We feed him with his dam and put him away. Thus your cow has fixed habits of letting down her milk, and if you care to milk that cow in after years she has that fixed habit; whereas, a cow running in the field with her calf is practically destroyed as a milk cow if you want to use her afterwards for that purpose; and then we constantly see the calves and know what they are doing. We begin with shelled corn and later add a little oats and then bran and then some oil meal, if we can get it, and good hay and good fodder.

Just a word about balanced rations. There is one thing about feeding beef cattle. In most cases they are fed to the full. If you put the feed where they can get it they will balance the ration for you. I am not going to advocate hard and fast rules along that line. It may be unfashionable, it may not be scientific, but I have noticed this in feeding our show cattle, if we want to get the highest finish and highest results and greatest weight at the earliest age, that we scarcely feed two of them alike. Those who have large families and help the plates of the children, even if the children are all well, will recognize that you can hardly make up two plates alike. If you make them all alike there will always be some dissatisfaction. A man who knows his children knows he need not put certain articles on all the plates. With stock it is just the same; some want one thing and some another.

By having the calves come in the Fall, when grass comes they are just old enough to wean, and then you don't ever have any bawling around. After you put them out for a few days it is all over. Another reason I like the Fall calf is this: That the first five or six months of his age, when he is quite small, he has consumed very little of your grain. He goes on grass when he is of the age to begin the consumption of feed and he eats the cheapest feed you have on your farm, so the second six months of his age, when he begins to work and consume something he is consuming your cheapest product rather than otherwise. If you have him born in the Spring he runs with his mother all the Summer, too little to eat much grass, and at weaning time he comes on your expensive feed, corn and grain. But if you are going to have Fall calves this necessitates a warm place for feeding and housing.

Now in regard to the sheltering of beef cattle: There is no class that requires so simple shelter as beef cattle. Any old shed that opens to the south and a protection from the west winds and rain is satisfactory to these cattle after a year old or even after they are six months old. I don't care anything about the cold, if they are dry and out of the wind. They take care of the cold if well fed and make as good gain with good feed in the open sheds. If you are going to feed in an expensive manner, under high tension, or if with silage to your beef cattle, then I think you will have to have them more closely housed and it is then a problem that each man will have to work out on his own farm.

I am going to give you a simple method by which you can feed cattle that will at least give you profitable results and I know it is a success, one of the simplest methods and in fact so old fashioned that I hardly dare name it; that is, the old fashioned method of feeding shocked corn and clover hay. Feed it in the open racks, open sheds, in the simplest manner. If you can get your corn well cut and well put up, and your land is such that you dare go out on it in the winter months with the wagon and get the feed, it is the simplest, and I believe, one of the most profitable methods that can be used. Let me show you the difference between that and the other method. Suppose you determine to feed in a complicated method and use silage and ground feed in connection with that. It first involves the silo; it next involves a good warm barn; it next involves the husking, shelling and grinding of the corn which you don't put in the silage, for the finishing period. It involves

feeding in the inside which is always more laborious than feeding in the open racks. It takes more time and you have added almost one-third to the cost of the feed by the time you get it into the cattle, but you have not added a third to its feeding value. You have added slightly but not one-third. If you have a silo convenient or can get it at a reasonable price, if you have the power and the grinding equipments and shelling equipments, well and good, but this thing can be done with the simpler method and with as great profit to the farmer as he will find the other way. Several times we have topped both the Pittsburg and Chicago markets with carload lots of cattle, handled as I have told in the simple ordinary old fashioned way, therefore, I know it can be successfully and profitably done. The cost of the more complicated way forced many men out of the business. I said to you that the cattle-growing business was drifting back East. I want to give you one of the reasons for that—because of the great expense of growing beef in the West to what it once was. In much of Texas the method has been to feed cottonseed meal. Texas is the greatest cattle-producing state in the Union, and has more cattle interests than half the other states put together. In 1880 the cost of feeding a steer, finishing on cottonseed meal, was $6.00 to $7.00 per head. In 1890 it had risen to $11.25 per head; in 1900 to $17.50 per head, and in 1910 the cost of feeding cottonseed meal in Texas will be from $25.00 to $27.00. per hundred. Now you can see that Texas is getting itself in the position where you can begin to compete. When they were finishing steers at from $6.00 to $7.00 per head on cottonseed meal and it was costing you $20.00 to $30.00 on corn, you can see that you could not do it. But now they have gotten to the point where cottonseed meal is costing from $25.00 to $27.00 per head to make their steers and you can meet with that competition; and this is true through nearly all the West. The advanced cost of producing their beef has become so great that the drift is again eastward, and profitable beef production can be undertaken in the East.

The question comes up as to how far to carry the steer, whether to make baby beef of him or sell at the later age, and let me give you some figures again. For a period of five years the average 1,500 pound steer in Chicago was bringing $6.03 per hundred; the average 900 pound steer was bringing $4.40, a difference of $1.63; and the total gain there per hundred as between the 900 pound and 1,500 pound steer of twenty-seven and one-third cents. Let me take you over a fifteen year period in Chicago, all of the cattle of all kinds that went over the scales in fifteen years. The 1,500 pounds steer averaged $5.51 per hundred while the 900 pounds steer averaged $4.25, a difference of $1.26 or a total gain of twenty-one cents per hundred pounds. Now you can see there is a fixed rule by which the heavier cattle, the more finished and heavier, make a good gain in price per hundred pounds, and so it will be up to you to determine when you want to let go of your cattle. If you carry them to the finished period you may depend on a good price and a fair profit.

I don't know that I have covered this subject, but I believe in the success of beef cattle, that they can be profitably produced, not only in Ohio, but I believe they can be profitably produced in Pennsylvania. And I want to say this to the young men who are present:

"And I have said and I say it ever,
As the years go on and the world goes over,
'Twere better to be content and clever
In the tending of cattle and the tossing of clover,
In the grazing of cattle and the growing of grain,
Than a strong man striving for fame or gain."

The CHAIRMAN: Are there any questions you wish to ask Mr. Bradfute?

MR. BLYHOLDER: I would like to ask if the fifteen year period that was cited was the last fifteen years?

MR. BRADFUTE: It does not include the last year.

MR. BLYHOLDER: Up to the last year?

MR. BRADFUTE: Up to the last year; I should have said that. The last year has not been a fair rule to go by with cattle or hogs.

Permit me just one word that I notice I have overlooked. I did fail to say with reference to feeding shocked corn that that method necessitates hogs along with your cattle. To be profitable you will have to have hogs with your cattle to make a success of that method.

PROF. MENGES: The speaker has said that he has used a method for these cattle to balance up their own rations. I would like to know how that is done.

MR. BRADFUTE: If you take and put your shocked corn in the rack, with the fodder in good condition and a good quality of corn, and fill a rack with clover hay a little to one side, a rack so constructed that it will not be wasteful, and let them consume just what they want, I don't believe you can balance their ration much better than they will be able to do it. But have everything there. They will simply consume the proper amount and it is their business to know how to do that.

A Member: How about straw?

MR. BRADFUTE: I don't know well about straw. I don't think they will do so well. They will eat some straw.

I am fond of oats for growing cattle but we are not in the oat country and by the time you buy your oats at present prices they cost more than they seem to me to be worth.

A Member: Have you ever tried Canada field peas?

MR. BRADFUTE: No, our country is a corn and wheat and clover hay country.

DR. FUNK: Wouldn't that balancing of rations be like putting a boy to the table with bread and butter on the one side and pie on the other. He would eat pie all the time?

MR. BRADFUTE: He would eat pie for a few days, but I think he would stop pretty soon.

MR. GOODERHAM: He speaks of bringing the corn from the field in the shock. Are you bothered much with snow?

MR. BRADFUTE: Well, we had sixteen inches last winter and it wasn't a pleasant job for a while. You will find it possible, if you are not feeding too many cattle, only a carload or less, to have a number of shocks drawn up close at hand to take care of yourself when such times come. There are times when it is too muddy and the snows are too deep to bring in the shocks handily. But on the other hand there is no nicer time to draw out the shocks than when we can do it on the sled. A man will have to use his judgment as to the nature of his country, and as to location in regard to many of these things.

MR. PEACHEY: You spoke of oil meal. What is the limit of price?

MR. BRADFUTE: I think when oil meal gets up to much over $30.00 it is beginning to get prohibitive. Cotton seed meal will stand higher prices because you get more of what you want in cotton seed than oil meal. On the other hand, it is not desirable for hogs and many cattle do not like it.

MR. PEACHEY: What would reach the limit of the cotton seed? I paid $40.00 this winter.

MR. BRADFUTE: That is a good, big price. It is $5.00 more than it ought to have cost you—than it was really worth to you unless you absolutely had to have it to bring your ration to a satisfactory balance.

MR. HERR: How do you dispose of the manure which we in the East consider quite an item for the farm?

MR. BRADFUTE: The manure proposition is one of the greatest profits in feeding beef cattle. You have consumed all the roughage on the farm and put it into manure. If you feed under the shock method you cannot haul it out as made. It will have to remain in the pile and more thoroughly rot. You will have some loss there. On the other hand if it is carefully fed in one place and you use your racks and keep your pile well piled it can be taken out the next summer. It will lose very considerable but not as much as I think many would lead you to believe.

MISS BAKER: The lecturer has spoken of the necessity for a warfare against flies. I think it would be interesting to know that the American Civic Association, of which J. Horace McFarland is president, has included in its work for this year a systematic warfare against flies and the methods of spreading that warfare has been to prepare magnified pictures and slides showing the life history of flies, and arrangements have been and are being made to have

those pictures shown wherever there is a moving picture show in the United States. Mr. McFarland has asked that the members of the American Civic Association and those who are interested in its work shall speak wherever they have an opportunity to people of rural communities, calling their attention to the educational work of these slides and asking them to acquaint themselves also with the life history of the fly, insomuch as the breeding places of the pests are in every rural community. I believe in doing what Mr. McFarland has asked to be done, and I hope you may have an opportunity to see these slides that have been prepared for the education of the mass of the American people.

PROF. COCHEL: Whether or not the 900 pound cattle did not include all of the stockers or feeders on the market and the 1,500 pound practically all the fat cattle, and we are getting a comparison between fat cattle and thin cattle rather than between the different weights, and if it is not also a fact that the 900 pound to 1,000 pound steer finished during July, August and September each year will not sell within ten cents or fifteen cents as much per hundred as the two year olds that weigh 1,500 pounds; that it is the condition that is the thing that makes the price rather than the weight?

MR. BRADFUTE: I think that the Professor is quite right on that. The weights I gave are taken by all classes of the cattle going from the yard. The thing I meant to show was the relatively safe proposition of increasing the weight on a bunch of cattle: that it is profitable to even fatten cattle. I said the better proposition is to finish him from the start so that he will bring the top price at 1,000 to 1,200 pounds or even smaller. But as a general proposition it will pay to add the weight unless you know that you have him finished earlier.

A Member: In raising this beef type of cattle, what do you do with the female cattle? Do you give them the same treatment as males?

MR. BRADFUTE: Many loads of cattle coming to big markets have a large percentage of females without any dockage. You can take a car load of steers and have a number of high class heifers in them and get very little cut on them if you know your business and your buyer knows his business. It is fashionable to make a tremendous cut on female stuff, but I want simply to hint that it is done in many cases because you allow it. It is profit for the other fellow.

A Member: What excuse do they give for docking?

MR. BRADFUTE: They don't need to give any. They have been in the habit of paying less for the females. They cut with more waste. You cannot cut out heifers and get quite so much high class beef. You will have more of the surplus tallow on the heifer than on the steer.

A Member: In other words, all the beef people are not from Missouri?

MR. BRADFUTE: They don't seem to be.

The CHAIRMAN: The time is growing short. I believe it is necessary to bring this matter to a close.

We have next on the program a gentleman who, I understand, is originally from Missouri, later from Indiana and at the present time at the Pennsylvania State College connected with the Department of Animal Husbandry. This gentleman last winter was in our county giving a demonstration of livestock judging. If he pleases you as well in his talk to-day as he did the people of Greenville, I know you will be well satisfied. His subject is "Beef Cattle; Their Relation to Agriculture in Pennsylvania." I take pleasure in introducing to you Prof. W. A. Cochel, of State College, Pa.

BEEF CATTLE—THEIR RELATION TO PENNSYLVANIA AGRICULTURE.

By PROF. W. A. COCHEL, *State College, Pa.*

The function of Beef Cattle in Pennsylvania, as in all other states, is to convert the crops grown on the farm into a more concentrated and palatable product for human consumption. In great areas of the West beef cattle are used as a means of marketing grass which would otherwise have no value. Coming farther East they are used in the corn-belt to market surplus corn and clover. As the preceding speaker has clearly pointed out, they must be handled with a minimum amount of labor if they prove profitable. In our own State we should first consider the feeds which we have at our disposal, of which grass constitutes by far the larger part. In addition, we have an abundance of roughage in the form of clover, mixed hay, cornstalks and straw. Grain is not produced in so large proportion as roughage, hence we should try to produce such beef as can be made largely on rough feeds with a minimum amount of grain. Fortunately the local demand does not call for the thick, heavily fattened animals which can only be produced from a long period of full feeding on concentrated feeds, but for "good killers" and "butcher stuff" which would require from sixty to ninety days feeding to make them "prime." These two factors fit very nicely together and indicate that the Pennsylvania feeder is fortunate in having a demand for the kind of beef most easily produced with the feed at his disposal.

Your College of Agriculture and Experiment Station has undertaken a study of a few of the factors which have a direct bearing on profitable methods of fattening steers. For this purpose two carloads of "feeders" were purchases on the Chicago market at $4.65 per cwt., December 1, 1909. They were shipped to State College and allowed two weeks to overcome soreness from shipping and to become accustomed to new conditions before the Winter's feeding experiment was started. Charging the cattle with commission, yard-

age and freight enroute, also for all feeds consumed before the beginning of the Experiment, made them cost at that time five (5) dollars, per cwt. They averaged eight hundred pounds per head in weight. They were fed in four different lots during a period of five months, at the close of which they were valued by Mr. J. K. Conrad, of Pittsburg, using the Pittsburg market value as a basis for computing financial results.

Lot I was fed a full feed of grain, with roughage limited to what they would clean up readily. Lot II was fed two-thirds as much grain as Lot I with all the roughage they would consume. It was found from this comparison that the steers fed a full feed of grain made more rapid gains and would have had to sell for $6.68 per cwt., at the close of the experiment to pay for feeds consumed, while their market value at that time was $7.60 per cwt. The profit per steer was $9.96 which made the corn fed bring 97.1 cent per bushel. When a lighter grain ration was used the rate of gain was not quite so great, the cost of gains less and the cattle would have had to sell at $6.23 per cwt., while their actual value was $7.35 per cwt. The profit per steer was $11.80, making the corn fed bring $1.19 per bushel. The heavy feeding of grain during so long a period as five months was not justified by the additional finish carried by the full-fed cattle over those receiving a limited ration as the difference in cost was thirty-five cents and the difference in value only twenty-five cents per cwt. This experiment clearly demonstrates that the Pennsylvania feeder, using high-priced corn, cannot afford to put steers in prime condition, as the local demand is usually for a cheaper grade of beef.

The second experiment was one to test the influence of shelter for fattening steers which have a roughage ration made up largely of corn silage. The cattle were quite uniform in age, type and condition. One lot was fed in an open shed, boarded up tightly on three sides, open to the southeast, the other lot in the basement of a bank barn, well lighted and well ventilated. Each lot was given the same amount of concentrates with roughage according to appetite. The results show that the steers fed in an open shed gained 2.36 pounds per head daily as compared with 2.13 pounds by those in the barn. At the close of the experiment the open-shed steers had cost seventeen cents less per cwt., were valued at fifteen cents per cwt. higher and made a profit of $3.98 per steer, more than those fed inside. The corn fed outside brought fifteen cents more per bushel than that fed inside. This test clearly demonstrates that the feeding of corn silage does not necessitate the use of warm quarters for fattening cattle. It is essential, however, that the steers be well-bedded and protected from wind and rain.

The work of the Station has clearly demonstrated that, under the conditions prevailing during the past winter (1909-10), beef cattle bought upon the open market, fed intelligently, have paid market price for all the roughage consumed in addition to one (1) dollar per bushel, for the corn. This does not include the value of the manure nor the amount of waste feed utilized by hogs. While the price of beef was exceptionally high during the past year, the same was true of "feeders" and of feeds, so that the results are not abnormal.

In closing, I might say that the function of Beef Cattle in Pennsylvania is to utilize large amounts of roughage, to enable the farmer to carry a large amount of livestock in proportion to the

labor required, to turn to profitable account large areas of rough grazing land that is at present not under cultivation, to furnish a market for the damaged and unmarketable material produced on practically every farm and at the same time build up the soil in order that it may continue to produce maximum crops. If the farmer will go into the production of beef in a conservative way, selecting cattle of the proper type, he will undoubtedly, in a series of years, be in much better financial condition than one who markets his crops in their original state.

The CHAIRMAN: This is a good time to question Prof. Cochel.

SECRETARY MARTIN: Now gentlemen, be prompt with these questions.

MR. SHAFFER: You don't think this waste land will produce as much if devoted to sheep raising?

PROF. COCHEL: Well, it is not everybody that is exactly capable of handling mutton sheep or otherwise I would say the production of mutton sheep would be more profitable on this waste land. There are two questions that come up in sheep raising, one is the dogs and the other is the parasites that bother the sheep; and on the other hand beef cattle are the healthiest animals that can be kept on the farm and can be handled in larger numbers, and so I say the waste land should be devoted to the production of beef. On the other hand, if a man is adapted to the production of sheep or mutton, then the sheep proposition is just as good.

A Member: I would like to ask whether there is an advantage in feeding silage?

PROF. COCHEL: Well, in feeding silage for beef cattle we must consider one thing. If we expect to feed shocked corn the steers eat the ears of the corn, the blade and part of the stalk and as they fatten they eat less of the stalk and some more of the ears. Therefore, you are feeding concentrated corn. So that at the close they will eat nothing but the corn. They will leave the cobs and the stalk. In feeding the silage the corn is so mixed with the corn, with the stalk and the leaves, that the steers are forced to eat every part of it. We must consider silage as a supplemental feed. Silage and clover hay make one of the best rations. But in fattening we have to feed grain in addition to silage. Then there is one mistake in beginning to feed silage and that is that there is grain in the silage and they need not feed grain, and in doing that the hogs utilize just as much of the grain as they do.

MR. DAVIS: What about molasses as a feed?

PROF. COCHEL: I never fed molasses. I have heard reports of molasses feeding and those who are feeding it like it very much. Molasses, of course, is used as an appetizer for the steer and it does not furnish a large amount of protein.

A Member: What is that point on which you do not coincide with Mr. Bradfute?

PROF. COCHEL: That is on feeding silage outdoors in winter.

MR. BRADFUTE: Would you not have gotten better results in the finishing period if you reduced your silage and increased your corn a little, for about thirty days?

That is a question that I tried to work on at Purdue a few years ago. If we would gradually eliminate the silage and put on dry feed I think they would ship better.

The CHAIRMAN: I would like to ask if Prof. Gilliland is in the house? He does not appear to be here. He is advertised for the next period and if he is not here we will not take up the other topic, but if this topic is closed I would like to call on a man who is rubbing his bald head,—not that there is anything in it—for a few words, Mr. E. S. Bayard, Editor of the National Stockman and Farmer.

ADDRESS.

By E. S. BAYARD, *Pittsburg, Pa.*

You know what I told last year, you can't keep a good man from "coming out at the top."

I am very much interested in this discussion on beef cattle and I think that is the reason Mr. Black called upon me, because he is a beef cattle man and he wanted to prolong this discussion.

The CHAIRMAN: We don't want any other subject introduced.

MR. BAYARD: I will try to keep on this subject. There is one thing I want to emphasize and that is in regard to our markets in Pennsylvania. We have a peculiar market here in our coal and manufacturing towns. It requires ordinary or half-fat cattle. I have come to the conclusion that it will pay a man to buy in the fall common cattle, the kind he can buy cheap, and feed them for this market. When you come to breed cattle, breed the best you can. But the man who feeds cattle can profit by the other fellow's folly. The cheaper he buys them the better for him, because he can often make a greater improvement in value on the common steer than on the other kind, especially if he does not carry him to a finish. Take a common steer in the fall and when he has more flesh he goes up a notch in the market classification. These cattle, to be sold before they are fat, can use a cheaper class of fed than the good cattle. They lack breeding of course and when marketed make ordinary butcher cattle. They sell comparatively high because of the peculiarity of our market that does not require so much fat. The country

butcher pays a comparatively high price for the common steer. The butchers are paying now around $7.25 for pretty ordinary steers. It seems to me that Pennsylvania people should adapt themselves to the requirements of the meat market. They can buy this common stuff cheap in the fall and they can sell it comparatively high from the 1st of February on up to June or July. Of course if you have to ship your cattle where they require high-class beef I would not take that kind of cattle.

I often wonder if the people of the State understand much about the grades of cattle in the market. I remember a number of years ago a man came to Pittsburg with a load of steers that sold for less than our lowest quotations for common ones. He found out who I was and he gave me a call-down. He said he had good cattle and they sold below our lowest quotations. We went down and looked them over. I had never seen such cattle as he had. I didn't know cattle could be that common. They were little mouse-colored and brindled knot-heads. Those cattle were raised somewhere in the brush. They didn't have anything about them that good fat cattle ought to have. Yet he thought he had good cattle and thought he would get a good price for them. Now the market price does not depend upon what your idea of cattle is. It depends on what the killer's idea of cattle is, the man who cuts them up. It is his ideas and not yours or mine that count.

Would you like me to tell you something about the grades of livestock? In the first place for the past winter the market-topping steer has been one of some weight, smooth and fat, 1,350 to 1,450 pounds—they don't like them heavier than 1,450 pounds. This week a load of cattle sold at $8.70 that topped the market. They weighed 1,434 pounds and they were good. Next to that we have a class of cattle that have the weight and flesh but not quite as much quality. They have not the shape, not the breeding, possibly too much soup bone underneath, perhaps a little plain. Then we come to another grade that weigh around 1,200 to 1,250 pounds, good and fleshy but not quite heavy enough to bring the top, sometimes bringing more than the heavier type but not at present; those cattle are selling around $7.75. Then we have what we call good butcher steers, good fat butcher steers, 1,100 to 1,150 pounds. They must be well shaped and well bred and well finished, and you can get a steer that weight now of good finish. I saw several loads of cattle of that kind sold on Monday that I call good cattle, at $7.60 and $7.75. In the summer time they sell higher in proportion than the heavier cattle do, but you all understand why. Butchers cannot keep the heavier carcasses so well in the hot weather. Then we get beyond that and have the ordinary class of butcher cattle weighing 1,000 to 1,050 pounds. They sell around $7.25 now. And then we go below that to a rather common lot of butcher cattle, weighing 900 to 950 pounds and selling at $6.50 @ 6.75. When you go below that you get into the trashy class, $6.00 @ 6.25 the way the market is now.

Perhaps I would better say something about market bulls, cows and heifers. When I first went into the cattle business if you raised a heifer, no matter how good, you got no price for it; 3 @ 3½ cents for a good heifer. This has changed. To-day you can sell your fat heifers to the butcher markets all over our State and get a good price for them. I saw a load sell for $7.90 per cwt. the past winter and

they were not all heifers, a few cows among them. A good fat heifer weighs from 800 to 1,000 pounds as a rule, sometimes they weigh more, but that is the kind they like. I saw three averaging around 850 pounds sell the other day for $7.50 per cwt., good and fat. Cow buyers like them to weigh from 1,000 to 1,200 pounds. A really good young smooth cow is worth now around $6.50. If older and full of tallow they don't bring so much money, some of the older ones with more fat on them $5.50 @ 5.75.

Bulls sell well now. Any man who is a good feeder I would be willing to keep in bulls if he would give me his old ones when he is done with them. What excuse is there for not breeding good cattle under those terms? You take an old bull and you can sell him any time between the 1st of January and 1st of June for enough to replace him with a young one. I am talking about those bull calves you can buy for $75 to $125 to use on good grade herds. The breeder can sell you a yearling calf to take the place of your old bull for what you get on the market for your old one if you take care of him. Why are bulls so high? The pure food law has something to do with it, by forbidding the use of coloring matter in bologna. High-colored bull meat is used to get the color into the bologna. I have seen a few bulls sell this winter for $7.25, a whole lot a $6.75 @ 7.00 per cwt. It takes a pretty good steer to bring $8.00. What excuse is there for not having better cattle when we lose nothing on our bulls?

In regard to the hog market we have another thing in this State that is advantageous to the producer. It used to be we had to feed a hog a long time to get him heavy. You don't have to do that now. Yesterday light hogs sold at the top—$10 a hundred pounds. The hog does not have to be fed so long to get the money out of him. The hogs in the Pittsburg market are graded thus: Heavy hogs, anything of 250 pounds or over and sometimes of 225 pounds or over. Medium weights, hogs of 180 to 200 pounds. Heavy Yorkers, hogs of 160 to 175 pounds, and light Yorkers, 125 to 150 pounds. These hogs are called Yorkers because New York buyers used to take these weights while Philadelphia buyers took heavy hogs, which were then called Philadelphias. That name has passed away now, as Philadelphia takes light hogs too. Heavy hogs are still taken by Boston and Providence. Then we have pigs, 90 to 110 pounds, which along with light Yorkers now top the market. One year with another the heavy Yorker or medium-weight hog sells here as well or better than any other. Considering cost of production these lighter hogs make the feeder most money—the younger the hog the cheaper the gain. Another point where the market favors the producer. "Roughs" are fat sows and sell well. Stags are not docked in weight but in price.

A Member: Why did we run out of hogs?

MR. BAYARD: I think one reason we ran out of hogs is that two years ago the hogs sold below the cost of production and farmers did like all manufacturers do—quit producing them.

In the sheep market we used to have a big fat wether at the top. Now we are handicapped if we have heavy sheep. In Pittsburg they don't like a sheep of over 100 pounds. I believe we ought to

use the heavier cuts because they are more economical on the table, but the trade does not call for them. Butchers must have them light. And the same way with lambs. They don't want them over 80 or 85 pounds or they will be too heavy for the market. I ran across a peculiar thing in the Pittsburg markets Monday, in spring lambs, just to show you how little market things go. We have been advocating for years the docking of lambs, but now buyers want spring lambs with tails on. Why do the butchers kick about cutting off lambs' tails? The butchers say slaughterers are running in the yearling lambs for spring lambs and the only way to tell them is to leave the tail on. Of course, if he pays ten cents a pound for spring lamb he cannot compete with the man who pays seven cents for a little fall lamb or last spring's lamb. All these things and a whole lot more you will find out if you stay around the market some time.

I saw something the other day that utterly disgusted me. Some secretary of a dairy cattle association went on to show that dairy cattle were just as good for beef as any other cattle. We all know better. He will know better when he takes a load of them to market. I have seen them sell and I saw one time Brown Swiss cattle, not such a bad shape, but were discriminated against because of their color. A seller in Pittsburg one day called me into a pen of these to prove to the buyer that they were not Jerseys. The buyer would not buy them on account of color, which resembled Jerseys, and I had to tell him they were Brown Swiss and would not kill like Jerseys. The buyer knows what he is talking about, because he takes the animal and kills and cuts it up and he has got to make his money out of it, and that has not been so easy the last year.

Many people talk about the enormous profits the butchers are making. If you get into the butcher business you will find there is a great deal of waste in cutting up cattle and hogs and sheep, and everybody who buys meat in the State is doing his share towards the high cost. Instead of going down to the market and buying a chunk of meat we go to the telephone and order twenty-five cents worth of it and the butcher has to send a man and a horse and wagon up with it, and the delivery costs almost as much as the meat. Another thing: We will spend a lot of money for cigars and for other luxuries that don't do us any good, and when we add a cent to the price of a pound of meat or a quart of milk every man will rear and kick! And then he'll go and spend twenty-five cents for a cigar or buy half a dozen men drinks! We must educate the consumers too. They need it worse than we do. I have had experience on both sides.

Here is another matter. I talked with a man the other day who told me about the tariff on shoes. He said the market would be flooded with cheap English shoes because the tariff had been reduced. I said: Well, you knocked the tariff off the hides that I produce, why should not I knock the tariff off the shoes, the products of these hides? I am entitled to buy my shoes on the same basis that the manufacturer buys my hides. We farmers can't afford to sell our wool and hides on a free market and buy all our clothes and shoes on a protected market, and we are a lot of chumps if we allow it; but we are going to be asked to do that same thing.

I see it coming—all tariffs off farm products, and they are going to leave tariffs on everything we buy. We are a set of fools if we allow it. I don't want to be led into a tariff question, but I have to show your chairman there is something up here (indicating his head) inside, if there isn't very much outside.

MR. BRADFUTE: Isn't is a fact that when cattle and hogs are very high the question is not one so much of difference between the high class and the lower class selling at one price?

MR. BAYARD: The past winter, Mr. Bradfute, the cattle have been exceptionally well finished, exceptionally good, and so the low grades of cattle have been comparatively scarce.

MR. PEACHEY: Would you have got the proportional amount of cattle, and now then, comparing them with the better grades, when you put that feed in them do you get a proportional amount of value out of them compared with the good breed?

MR. BAYARD: Well, I think in this way only—because you buy them so cheap. This lot of steers that Prof. Cochel and I bought on the Chicago market for $4.65 were a decent lot of steers. You could have bought steers there that day for $1.00 a hundredweight less. They had not the style, but they might have made as much money.

MR. PEACHEY: Would you have got the proportional amount of gain for the feed put in them?

MR. BAYARD: Yes, sir. I think so. As to the breeding of the steer and the amount of gain that he is going to put on him, a common steer will put on just as many pounds as any steer, but not on the right place.

MR. PEACHEY: He will put on as many pounds?

MR. BAYARD: Yes, sir. He has just as good an appetite as any steer—more appetite than anything else. He will eat just as much and will gain as much, but will not make as valuable meat of it. Experiments have shown that. I was under the impression that the better bred the steer the more pounds he will put on for the amount of feed, but experiments fail to show it. But you can buy the low-priced steer for so much less money and sell him in the market like we have to-day at a proportionally better price. This is one reason why I think it would pay to look into the common steer business. I would like to have Prof. Cochel's idea.

MR. PEACHEY: I would like to have somebody's on it for information.

PROF. COCHEL: So far as the utilization is concerned the scrub will make as much, as good use of the feed. Sometimes the scrub is so restless and nervous and thrashes around that he burns up more feed in maintenance and has less to use for production; but if a quiet sort of a scrub and willing to live like the quiet beef animal does he makes use of just the same proportion.

There is another thing to be considered: As the feeding period progresses the gains get more expensive. Their appetite fails to some extent, and the weight is greater and there is more maintenance, and if you make them real prime during the last month of feeding they will eat practically as much as the two months previously and not gain over one-half as much. So the condition he goes to the market and the amount of fat he carries determines what he does with the feed.

A Member: Don't you always make a little bit when you have good cattle?

PROF. COCHEL: I have always advocated the use of good cattle on general principles. If you feed cattle on the market and feed them the cheapest sort of feed and not too long there is money in the scrub cattle. On the other hand even these buyers that I become acquainted with don't object to the steer being well bred if not too fat. These men would prefer to have the smooth and meaty animals.

MISS BAKER: Mr. Chairman, I would like to ask whether the permanent grass lands or grazing lands that the Professor referred to stood well in this State. I am not well enough acquainted. I have only been here since the 1st of December.

PROF. COCHEL: I will tell you the system we have used in getting permanent pastures in the West is to seed them down to grass and then manure them very heavily with top dressing occasionally or feed cattle. That is the most successful method we have practiced. The trouble with our grazing lands is that the stock are left eat every thing off it, eat it right down to the root and we are always taking stuff off and not putting anything back on them.

SECRETARY MARTIN: Before we close this session that has become such an interesting one, I desire to announce the program for immediately after dinner, at 1.30.

"Practical Methods of Potato Growing," by Mr. E. A. Rogers, of Brunswick, Maine. Mr. Rogers has just come into the audience and is ready to entertain us this afternoon. And then we will have the poultry question taken up by Mr. J. T. Campbell and Mr. W. Theo. Wittman, of Allentown. That comprises the program for the afternoon.

As announced at the opening of the session, the photographer is at the entrance to the court house and we have in mind the taking of photographs of the County Chairmen of Institutes in one picture and the Institute Lecturers in another. This latter comprises not only the regular lecturers but all outside speakers on this program and others who are taking part in this work. That includes our friend Mr. Bayard and others who are in one or the other of these classes. Immediately on going down stairs remain there for the photographs. Let the Institute Managers form first and then the Lecturers.

The CHAIRMAN: I now declare this meeting adjourned until 1.30 P. M.

Wednesday Afternoon, May 25, 1910.

Mr. W. A. Crawford in the Chair.

The CHAIRMAN: The first thing on our program for this afternoon is "Practical Methods of Potato Growing," by a gentleman who is an authority, being the author of a bulletin on potato growing; and I now have the pleasure of introducing to you Mr. E. A. Rogers, of Brunswick, Maine, who will speak to you on this subject:

PRACTICAL METHODS OF POTATO GROWING.

By E. A. ROGERS, *Brunswick, Maine.*

Mr. Chairman, Ladies and Brother Farmers of Pennsylvania: I esteem it an honor and a privilege to have this opportunity to come before you and talk on any agricultural subject, especially the one which I have made a personal study of since boyhood—the growing of potatoes. We, in the East, are on the threshhold of better times for the farmer. The last generation has seen eastern agriculture at its worst.

There are reasons for this which I sometimes think we overlook. If we go back a few years to the close of the Civil War when men of all nations were invited to come to this country, and were practically given free farms in the great fertile West, coming as they did by hundreds of thousands, taking up that fertile soil and coming into direct competition with the farmers of the East, the result was harmful to both the eastern and western farmers, as it forced the latter into a soil-robbing system of farming, not based on any scientific principles, and could not help but result in the depleted soils we now find in the West. At the same time the influx of agricultural products from these western farms crowded down prices here in the East so that there was but little, and in many cases, no profit left to the eastern farmer on his harder worked soils. The eastern farmer, after years of struggle to make both ends meet with the low prices prevailing, lost the high opinion of his calling he ought to have until it has become almost second nature with us farmers here in the East to cry down agriculture. This has forced our boys to leave the farm, especially through New England, and I presume that this is true also of Pennsylvania. Time is changing conditions; the western farmer, who for years sold fertility from his land in the form of grain, now finds his fields depleted of that fertility far beyond anything he believed possible, and he has now reached the same point that we here in the East have, that is, he has got to be a soil-builder instead of a soil-robber, and from now on the East and West stand on an equal footing as regards soil fertility.

This means a new era to the agriculture of the East; we can now talk to our boys of the money that can be made in farming and no longer tell them that if they ever expect to become well off they must

leave the farm. Why, it was drilled into me from the time I was knee high, that if I was going to make money I must get off the farm. This had a basis of truth twenty-five years ago here in the East, but it is not so to-day.

Then there are other things to consider worth more than mere money to those who stay on the farms. There can be and are good homes in the cities, but if there is any happy place in the world it is a good farm home. Did you ever know a millionare that was happy? Or did you ever know a man who was worth hundreds of thousands of dollars that was happy? If you want to find a happy man, woman or family go to some farm where they are making a comfortable living and a little to lay up besides. But when I was a boy they told the boys, "if you want to be rich you must leave the farm." They seemed to forget there were other things of greater value than gold and that one of them was a pure home out among the green trees where the birds sang and fruits could be had for the raising and no better homes can be found in God's world than we find on the farms of America to-day.

Another thing they told us when we were boys that has hurt eastern agriculture, and that was that our soil was worn out. We must get that idea right out of our heads. Here in the East we have no such thing as worn out soils. Our rock-formed soils will never be worn out, but will be producing better crops generations hence, under a more enlightened system of scientific farming than they have ever produced in the past. The chemist will tell you that in the first eight inches of clay loam soil that we have enough phosphoric acid to grow maximum crops from 150 to 200 years and potash enough in the same soil to grow maximum crops from 200 to 400 years, but locked up in an insoluble form, a wise provision of nature, to keep one generation from robbing posterity and prevented us from getting and selling it at the time our agriculture was depressed with western competition. In the second eight inches of soil there is as much more, and with scientific handling of our soils, we can make available from year to year enough to grow maximum crops, and we can go on indefinitely with no danger of robbing those who are to come after us.

What does our eastern soil need as much as anything? Vegetable matter. And of all crops, I think the potato demands it more than any other I know of if we are to have it do its best. If you give potatoes plenty of vegetable matter in the soil,—and I want to say that this is true of all soils in my section of Maine and I think it is true of you here, you can grow as good crops of potatoes as they can grow anywhere. The more vegetable matter you have in the soil the more water will it contain, and the better will the crop stand the drouth. And another thing, the decay of this vegetable matter acting upon the locked-up phosphoric acid and potash, will liberate and make some of it available for our growing crop and save us from buying so much of these kinds of plant foods in the form of commercial fertilizer. Now let us imagine we have an old field here, one that has not been plowed for years and the hay has been cut and hauled off and no return made to the soil. Also that we have no barn dressing which we can spare to apply to this particular field, and we want to get a crop of potatoes and at the same time fit it to produce a paying crop of grain and hay in years fol-

lowing. An old field of this kind will, in my section at least, have a fairly good turf; this means that there is a fair amount of vegetable material here to help grow a crop of potatoes if put in the right place and condition. I like to get on such a field in the late summer or fall preceding the planting of potatoes, with a cut-a-way harrow and cut up this turf to the depth of five or six inches; this work should cover a period of several weeks, working it enough to entirely kill out and cut up the sod. This will also bring to the surface where they will sprout, millions of weed seeds, making our labor the next year when the potatoes are growing much less.

With a good sod to start with it is not necessary with us to sow rye and vetch to plow down in the spring, and where this is not done the land is not plowed at all until the following spring. When spring arrives the ground is again harrowed as deeply as possible. We now have all the old sod worked up finely and ready to plow under and the deeper this can be done the better crop of potatoes we will get. On my soil I plow not less than eight inches, and nine will be nearer an average. We now have turned down this worked-up sod or vegetable matter into the bottom of our furrows and have it in the best possible place and condition, not only to feed the potato crop but to hold moisture, and at the same time it is not in such a condition as to prevent the subsoil moisture from coming to the surface by capillary attraction, as would have been the case had the sod been plowed down without first being worked up into this finely pulverized condition. After plowing, the harrow is again put on, and we now have the whole depth plowed a finely pulverized seed bed with the worked up sod thoroughly mixed through the bottom half of the depth plowed.

This is the way this field shown here in this photograph was worked. Up in Southern Maine last year we had a dry season, the dryest we have ever known. From the 17th of June until the 17th of August we did not get enough rain to lay the dust, and two months with us during our longest days is pretty hard usage. I got the field planted on the 19th of June and you see it did not get much water until after the middle of August. When I planted I used a half ton of fertilizer per acre in the drill. Of course we use the planters almost entirely in my State, and I presume it is the same with you. This fertilizer was a 4½-7 and 10 used on this field I am showing you in the photograph. The fertilizer I am using this year is a little better in some respects or a 4-8-10, this is about as strong as we can make with using the highest grade chemicals without any filler. As soon as the field was planted I went over it with the weeder and brushed the rows down level. This could have been equally as well done with a brush or smoothing harrow or even a properly constructed plank drag, but as often as weeds show the field should be gone over with either a weeder or light smoothing harrow. Usually, previous to leveling down the rows after planting, I go over with a two-horse double cultivator and cultivate as deeply as possible and as close up to the rows as it can be done without disturbing the seed. When the potatoes get to breaking ground enough to show the rows nicely, they are given the second cultivating and then we are ready to apply the second application of fertilizer.

Perhaps I did not state that we plan in the State of Maine, and almost universally now, to use one ton of high grade fertilizer to the acre. Some of you may think this is excessive, but experience has proved to the Maine potato grower that it is economy to do so, as the increased amount of fertilizer over what we formerly used (12 to 15 hundred pounds per acre) will increase the yield of potatoes more than enough to pay for the extra amount of fertilizer, and leave that much larger amount in the soil for the grain and hay crops which are to follow. One ton of high grade fertilizer per acre will not only produce a large crop of potatoes running from three to over four hundred bushels per acre, and still leave in the soil with the liberated plant food which was originally there and made available by the cultivation of the potatoes, enough to grow a big crop of either corn or small grain and two years of magnificent hay crops. I am frequently asked why not apply all my fertilizer at one time and in the drill when planting. My experience is that ten to twelve hundred pounds in the drill along with the seed is all we can safely use without danger of the fertilizer burning or injuring the seed, and even this amount is not always safe on early potatoes, as usually they will not stand as strong fertilizer as will the later or more vigorous varieties.

More than this I believe I get a better crop by applying a part of it along the row after the potatoes break ground, and burying the fertilizer, weeds and potatoes all out of sight as you see I am doing in the photograph. From every leaf joint that is buried up there will immediately be sent out a new set of roots, and sometimes there will be three or four of these one above the other, according to the height of the potato stalks when buried; all these will be above this second application of fertilizer and makes the root system just that much greater, and the greater the root system the better will the plant stand drouth and the better will be the crop. I keep my cultivator teeth far enough apart so that I do not do any root pruning. I do not know how you do it here in Pennsylvania. I know they do it down in Jersey. They will take the potatoes up to one foot or more in height and cultivate them with the cultivator set to run so close that at the end of each row they can take a handful of the feeding roots of the potatoes off of each tooth. This is root pruning and is poor practice. I aim to increase the root system every time.

Now another word in regard to the fertilizer. I plan to have my nitrogen-content in two different formulas. The one used in the drill at time of planting not containing any nitrate of soda. Nitrate of soda will become available over night in a damp soil which we are most always sure to have at the planting season. As you all know, it is usually several weeks after planting before there is any root system to catch and use this available nitrogen from nitrate of soda and in case of a heavy rain right after planting much of it might be lost. It is better that the nitrogen-content of the fertilizer used in the drill along with the seed be in the form of tankage, dried blood and other forms not quite so quickly available as is nitrate of soda. In this way it is not likely to become available and be lost from the soil by rains before the plants will have formed a root system to utilize it. For the second application I will have the nitrogen-content made up of just about one-

half nitrate of soda. As I do not apply this until the plants get a few inches high, there is a root system already formed to take it up and it promotes a very rapid growth at this time which shading the ground helps to retard the growth of weeds and lessens the injury done by the flea beetle and other insects. If we are to bury our potatoes after they are up a few inches high we must have them come up good and strong. If they come up weak and spindly we cannot bury them deeply enough to kill all weeds without injury to the potatoes themselves but if they come up sturdy and strong we can cover them up several inches deep and they will immediately grow right up through from the centre. The large leaves that are buried do not come up and if there are any of the old potato beetles eggs on them they will never hatch. In the cutting of the seed we can do several things towards making a stockier plant. The roots of the eye run towards the stem end, hence we should cut above the eye in order not to cut off too short these eye roots, and cut in blocky pieces of good size.

A Member: Have you found in your experience any of the varieties that were too tender to stand that vigorous covering?

MR. ROGERS: Yes, sir.

A Member: I found this. I practiced that for thirty years.

MR. ROGERS: I have found that on some of the early varieties you have got to be a little careful and not bury them up too deeply. I would not risk to bury early potatoes as much as is shown in this photograph, but in this instance it was a case of have to. Why, I have seen it cost $20.00 an acre weeding a field infested with witch-grass. Usually I don't like to cover a field more than two or three inches, just enough, to kill the little weeds along the row that you can't get at with the cultivator. It is highly important that we have seed of good vitality. I think we can do more to increase our potato crop by selection of seed than in any other one point. I wager there are hundreds, yes thousands, of acres planted in Maine and Pennsylvania of seed of so low vitality that I care not what the season may be, there cannot be a paying crop grown from them. I suppose that one point of having vitality in the seed to plant has cost me over $1,000 to learn. I have made a selection of seed in the field by going over the field when three-fourths ripe and picking out the most vigorous hills. It is not every vigorous hill that is desirable for seed. The vine may be vigorous but the hill may not have the potatoes you want. The proper way to do is to go over the field and mark the vigorous hills by sticking down twigs.

A Member: What indicates to you a vigorous hill?

MR. ROGERS: I want a large stalk, especially near the ground and good, nice, vigorous, foliage that, under the same conditions as the other plants in the field, will keep its color and show vigor all through the season. Usually when you dig one of these hills showing these characteristics you will find as good yield of marketable potatoes as you will find anywhere in the field, but if the tubers

are prongy or ill-shapen don't take them. I have by a single selection that way, increased the yield over 100 bushels per acre. That is worth trying for. Suppose you hire one man and pay him $3.00 a day and he selects twenty-five bushels which will about plant two acres; the cost would be only $2.50 per acre. Would it not be worth your trouble if you could grow twenty bushels more per acre? And then you could save your seed from these two acres. If you work along these lines it will astonish you at how little cost you can increase your yield.

A Member: How do you keep the potatoes vigorous for seed?

MR. ROGERS: I suppose you mean those we have on hand to plant this year. If you have a nice, cool, cellar you can keep them from sprouting for some time in that, but when they begin to sprout, if you cannot use them, soaking them in the formula solution for scab will check the sprouts for ten days to two weeks. If the weather is warm enough so that there is no danger of frosts, spread them out doors where the grass is short, not over one deep, where the sun will shine upon them; if they are raked over once in a while they will sprout but little and I have kept them in good condition to plant in my state, hard and firm until the middle of July.

A Member: Do you bruise the sprout enough to start the sap? We take them and shake them until we start the sap and retard the development of the sprout.

MR. ROGERS: Anything we can do to retard the development of the sprout helps to retain what vigor the seed may contain. If you wish to grow a few potatoes as early as possible, take some about the size of hens eggs and spread them where it is warm and light until the sprouts are well started, say about three-quarters of an inch in length and then break off by hand all that have started on the side eyes, leaving only one or two of the very best sprouts on the seed end and plant these potatoes whole. These would have to be planted by hand as the planter would be most sure to break off the sprouts we were careful to leave. Whole planted seed will mature its crop much quicker than cut seed, and by doing as I have told you we get the benefit of the whole seed and still not get too many stalks per hill. Of course this would be too much work to be profitable on a large acreage, but for a very early market or family use it will help out if you are anxious to get them early.

MR. CALLAHAN: Do you think it would injure the vitality of the seed by storing?

MR. ROGERS: It would be possible under certain conditions. I don't know as I would be thoroughly competent to answer a question like that. Our storing is so much more favorable to their keeping than is yours down here, owing to colder weather. We usually dig the last of September and October, our nights are then cool, frequently with frosts, and the potatoes are put into a cool, damp,

cellar and the temperature is kept as low all winter as we can without freezing. I have potatoes in my cellar to-day that have started to sprout very little.

A Member: How long do you cut before planting?

MR. ROGERS: If I could have everything to just suit I would not have seed cut over twenty-four to forty-eight hours ahead of the planter, but I like to have it cut far enough ahead of the machine so that the cut surface will get well dried off. If any fertilizer comes into contact with the fresh cut surface it will eat into it and reduce the vitality of the seed. If you use land plaster and dust them as you cut them, seed can be kept ten days or two weeks without any danger whatever if spread in a cool place, but don't cut seed and put it into sacks and let stand as it is most sure to heat and spoil.

A Member: How about cutting and putting in bushel boxes?

MR. ROGERS: They will keep better in bushel boxes than in sacks.

A Member: Put in sacks of not more than one bushel and left open and there is no danger of heating.

MR. ROGERS: I would not say no danger; there is not so much danger.

A Member: I have kept them for two weeks.

MR. ROGERS: With the open circulation that is different of course.

A Member: There is considerable difference between cutting and putting in closed sacks. In regard to cutting, have you objection to using a machine for cutting?

MR. ROGERS: I have. I want to have them just about right. I am not able to cut all my own seed potatoes but I cut just as many as I can. If seed is in perfect condition when it goes into the ground I know that I stand a better chance for a perfect crop.

A Member: How many eyes to the piece?

MR. ROGERS: I am not so particular about that. I have more trouble to keep the size of my potatoes down to the market requirements than any other one thing. They grow too large. I would sooner have two or more eyes to a piece than less, but in cutting them I aim to have a size that will work nicely through the planter more than I do to get a certain number of eyes to a piece, and I plant them close in the row to keep them down to market size. I have my rows three feet apart and dropped them last year twelve inches apart in the row. I have in the past been dropping them fourteen inches but the potatoes grew too large. On this field

(showing illustration) those were buried up July 12th; they were dug in October, and with the dryest season we have ever known I got lots of tubers that weighed two pounds and over.

MR. KESTER: Do you use large potatoes for planting?

MR. ROGERS: I like a medium size potato when it has been grown from good selected seed stock. If you had a new variety, something that you originated and thought was pretty good and you could make me think so and I concluded to buy a bushel of you, I would not take a potato that would weigh less than a pound, and the larger, the better it would suit my purpose. Why? Because you never saw a potato that weighed from one to two pounds that grew from a weak spindling stalk. In buying seed of a new variety I always aim to get vigor and I would get vigor by taking these large tubers, but I might get undesirable traits as well, but planting these large potatoes and then making a hill selection from them for my own seed for the next year I could get both vigor and desirability. On the whole I don't like to take the large potatoes for seed. They cut to waste too much and it takes too many bushels to plant an acre.

A Member: It would require sixteen bushels per acre?

MR. ROGERS: It would require all of that unless you cut to one eye to a piece.

A Member: These selected hills, the seed you take from the selected hills, what is the smallest you would take?

MR. ROGERS: If I were planting those to grow seed to plant myself the next year I should not take any small enough to plant whole; but if I can get potatoes of the right size to plant whole from selected hills and not growing them for seed purposes I should take them in preference to the larger ones. If we go into our bins and pick out the tubers small enough to plant whole and follow this method for three years we will run out any variety you ever saw. You see that any weak hill or stalk will set just as many tubers as will a vigorous one but will only grow them to a small size, many of them just right for planting whole while the vigorous hill will grow about every potato too large for planting whole. In carrying on my experiments along this line I have planted some years as high as 118 to 120 bushels of whole seed. You get a nicer, rounder, crop from whole seed.

A Member: Is sprouting seed worthless?

MR. ROGERS: I did not say that—just what was your idea?

A Member: I want to know what effect it has on the seed to start sprouting.

MR. ROGERS: When you let them sprout in the cellar and break the sprouts off it reduces the vitality; there can be no question about that. We want to retain all the vitality we can. One of the best

ways with the least labor is to take the potatoes right out into he sun and spread them on the ground only one deep; they will keep longer in a nice condition to plant spread this way than any other method I know of.

A Member: Do you believe in level or hill culture?

MR. ROGERS: I don't believe in level culture. I cannot get as good results in my state.

A Member: How deep do you plant potatoes?

MR. ROGERS: Not less than three inches after the rows are leveled down after the planter, and if late planted I would rather have them four inches. In case of very early potatoes I should not have them planted as deep as three inches.

MR. KESTER: Would you plant them deeper if you had them perfectly level?

MR. ROGERS: I would not care to plant much over four inches deep in heavy soils, but on lighter soils it might be advisable.

DR. FUNK: In your bulletin I notice that in speaking of the potato running out and failing to produce as formerly, you give the suggestion that the probability is that the vitality of that stock has been reduced by the application of arsenical poisons. Have you any evidence to sustain that fact?

MR. ROGERS: My whole experience for the past twelve years sustains that as an undoubted fact.

DR. FUNK: The reason I asked that question is because for twelve or thirteen years we have planted potatoes and every year we have used arsenical poison in killing the bugs and used in the dry form and I think the vitality of those potatoes selected carefully each year is fifty per cent. stronger than twelve years ago.

MR. ROGERS: That may be the case, but the statement that I made in the bulletin I think is absolutely correct. You take the farmers of the eastern part of this country as a whole and they have been going on for thirty or forty years, or ever since the potato bug came in, and they have used no care in the selection of seed as a whole and we have had the injury done by these beetles and the arsenical poisons to the foliage. My experience has been that the arsenical poisons have had a greater vitality destroying effect than the mere eating of the foliage by the beetles. Now up in Aroostook county, Maine, the best potato soil in the state, they tell me that if they planted their potatoes on that new soil the way they did thirty years ago they would not get half a crop as compared with then. Now there could not be but one thing, the difference in the vitality of their potatoes.

DR. FUNK: Yes, sir, the very thing, the case of the vitality of the potato. The natural condition of this seed—the great bane in the care of the vitality of the seed during the dormant season.

MR. ROGERS: It is not the case in Aroostook county with its long cold winters, for they can keep their seed in perfect condition until June in any year. It may be the case to a certain extent down this way.

MR. PERHAM: In regard to this Bug Death that you recommend, where can we find anything that gives a description of it?

MR. ROGERS: I would suppose that you would find it in most any hardware store or agricultural warehouse here in the State of Pennsylvania. It is sold anywhere in my state, even in the grocery stores.

MR. PERHAM: Where is it manufactured?

MR. ROGERS: In Leominster, Mass.

MR. PERHAM: Would you prefer it to arsenate of lead in connection with the Bordeaux mixture?

MR. ROGERS: I certainly should.

Mr. Rogers here took several potatoes and cut them in the manner he advocates for planting.

A Member: What is the idea in having the pieces of a uniform size?

MR. ROGERS: They work better in the planter. I always want to get them blocky.

MR. McCALLUN: I would like to have that thing clear in regard to covering up the potatoes. In referring to that you say you covered them up from four to six inches on account of killing the witch-grass. Now I understand you usually cover about two or three inches.

MR. ROGERS: That is right.

MR. McCALLUN: After the stalk is about five inches high?

MR. ROGERS: I want the potatoes just large enough to see the rows well when I bury them up. This photograph shows an extreme case, but in one respect it is a good case to show what can be done in a pinch when weeds or grass have got the start of us. I don't like to have the potatoes get as large as these were.

MR. McCALLUN: Usually when two to three inches above the ground?

MR. ROGERS: Yes, sir.

MR. McCALLUN: Then you remove the little plows and use disks?

MR. ROGERS: Yes, sir.

MR. KESTER: What would you do if you did not have the disk coverers?

MR. ROGERS: Of course in that case you would have to broadcast your fertilizer. I have tried all ways. I am telling you the one that has given me the best results with the least labor.

MR. KESTER: After you have covered the potatoes do you harrow them?

MR. ROGERS: No, sir, we cultivate between the rows to loosen the soil and kill such weeds as may start, and if weeds start along the rows which are not reached by the cultivator I sometimes hill lightly the second time to cover up and kill these weeds.

A Member: Do you hill again?

MR. ROGERS: Not usually, when I put as much soil over them as I did those shown in the photograph. If only one and a half to two inches high when I bury them the first time, I sometimes hill them again lightly if any more weeds start.

A Member: What do you do to prevent blight?

MR. ROGERS: Spray. I do not know but what I am using up more than my time. If you can give me a few minutes more I will be glad to answer your questions.

MR. PHILIPS: Have you had experience with potatoes freezing off? I live in Southeastern Pennsylvania and this year we had a freeze that froze off potatoes that were three or four inches high down to the ground. They are coming out now. Of course I will know in two or three weeks what will be the result.

MR. ROGERS: You will have to go farther South to get the best answer to your question. We do not have many potatoes freeze off in our section because they are so late getting planted. I have had no experience along that line, but the potato growers up my way say you might as well plow them up when frozen off.

MR. PHILIPS: My own judgment is that there will be a superabundance of small potatoes.

MR. ROGERS: It seems to be the general belief in my state that potatoes that are frozen off never amount to anything. I never had any frozen off. The last two years it has been the 4th day of June before I planted any.

A Member: Our friend Bob Seeds says you are in a country where they have nine months winter and three months fall.

MR. ROGERS: We have nine months winter and three months Bob-sledding.

MR. McCALLUN: What do you do for those first bugs that come along?

MR. ROGERS: Why usually I don't have to do much of anything for them until the vines get up enough so that I can spray.

MR. McCALLUN: Those first ones do a lot of damage and cause a lot of young ones to come on, and I noticed mine before leaving for here were very full just where they were coming through the ground.

MR. ROGERS: That work really ought to have been done last summer. If you had thoroughly kept your potatoes sprayed last summer you would not have the old beetles thick enough to do a great deal of damage this spring. It is a hard proposition to control, the old beetles when the potatoes are just breaking ground. The only way I can suggest would be to cut potatoes and sprinkle with Paris green and scatter over the field; you would get rid of some that way.

A Member: What effect would it have on potatoes planted in the same ground for a number of years?

MR. ROGERS: As a general proposition I don't want potatoes on my soil two years in succession. The second year the quality is not usually as good as the first. Now I don't want you to understand that I say never to plant on the same ground the second year, because I have known men who have planted potatoes year after year on the same field and got a crop of good potatoes. The rule with us is that where we plant potatoes one year and the next grain followed by hay gives the best results.

A Member: I have heard men say that you could not do it. I know better than that. I have had a piece used for early potatoes for fifty-two years and I had early potatoes on it year before this the best that ever grew there.

MR. ROGERS: You understand about that statement. I know I have heard of such cases; but as a general proposition one year in potatoes then follow with grain and grass to get the vegetable matter back into the soil will give the best results.

A Member: Did you ever plant potatoes the 1st of July?

MR. ROGERS: I have planted on the 28th of June.

A Member: Did you ever have experience with potatoes that came up with little potatoes forming about two inches long on the stalk above the ground and no leaves?

MR. ROGERS: No, I don't remember that I ever had anything of that kind. I would think it was a freak.

A Member: Have you tried lime-sulphur instead of Bordeaux for blight?

MR. ROGERS: No, sir.

A Member: Do you know whether it has been tried the last two or three years?

MR. ROGERS: I don't know. Gentlemen I thank you very much for your attention but don't want to encroach further on anybody's time.

The CHAIRMAN: Anybody wanting a copy of Mr. Rogers Bulletin on "The Potato, Selection of Seed and Cultivation" can find them on the window ledge at my left.

The CHAIRMAN: The next topic on the program is "Some Modern Poultry Problems," by Mr. J. T. Campbell, of Hartstown, Pa.

Mr. Campbell then delivered his address as follows:

SOME MODERN POULTRY PROBLEMS.

By J. T. CAMPBELL, *Hartstown, Pa.*

The profits from the poultry industry are dependent on the ability of the fowl to live and to reproduce. Doubtless all our modern varieties of fowl are descendants of some wild species. In the wild state the fowl laid a few eggs and raised her brood, she had accomplished her purpose—reproduction. On this offspring, nature imposed many hardships so that only the most vigorous survived—began to again reproduce. Under demonstration with more favorable environments the weakling is enabled to survive and to reproduce. Not only this but the hen is enabled to produce several times as many eggs as in the wild state, as we shall later see, all calling for plenty of vitality to produce them.

Here then we have two principles involved, each working against the other. The call for greater vitality, greater ability to live and reproduce and the selection and breeding from birds often of low vigor. Hence we have eggs that do not hatch chix that die and many kindred trouble.

As long as we pay more attention to standard points than to constitutional vigor we may expect no improvement along these lines. It is of vastly more importance that the fowl have strong, straight legs set well apart, than that there be no down between the toes.

The short, stout, sharply curved beak and the short, thick head with the eyes prominent and set well back in the long cavity will avail much more than five points on the comb, when it comes to getting a profit out of our farmer flock. The farmer usually buys his breeding stock on the show records of the breeder, getting cheap stock he has neither show birds nor stock selected and bred along the practical lines.

Good, pure bred stock will pay a big profit over the mongrel, provided the pure bred stock are selected and bred for constitutional vigor more than for fancy points. At the West Virginia Experiment Station during four winter months a pen of good mongrels laid 364 eggs and a similar number of strong vigorous White Leghorns laid 1,029 eggs, both pens getting the same care and feed. Some instances are on record where the mongrels have outlaid the pure breds. This can easily be the case when the mongrels have plenty of vitality and the pure breds are the weakly kind often found in the small yards of the fancier.

The advertising of breed to lay, trapnested fowls has deceived many. There is not one particle of evidence as far as I have been able to find to show that the egg laying capacity of the race can be increased by breeding from the heaviest layers as indicated by the trapnest. In fact the evidence as far as I can learn is on the reverse side. In my own experience I would rather have hens raised from stock of moderate producers than from the heaviest producers. I get more vitality in this way. Nature seems to put limitations on some of these things. That there may be a degree of protection to the vigor of the race, we often see excessive fecundity accompanied by partial sterility.

In fact I am inclined to think that the limit has been reached in the number of eggs the hen can be made to produce as far as breeding has to do with the matter. The records show that hens, under favorable conditions laid as many eggs one hundred years ago as now. On this point see Experiment Station Record, page 279, Sept., 1909. The most careful breeding by skillful scientists has failed to increase the average production of the race. It is one thing to call out the poor layers, and quite another thing to raise the average of the race by selective breeding.

On this point I quote Dr. Pearl, of the Maine Experiment Station: "The data so far obtained do not indicate that egg producing ability is sensibly or directly increased between mother and daughter. The mean egg production of the daughters of the 200 egg hens, is with a single exception smaller than the egg production of the birds not daughters of the 200 egg hens.

"The results of these investigations agree with those of other workers with plants and animals and show that the chief if not the entire function of selection in breeding is to isolate pure strains from a mixed population. It is found by actual experience impossible to bring about by selection, improvement beyond a point already existing in the pure isolated strain at the beginning."

If careful scientific men are not able to accomplish results with the trapnest, what may we say of the many amateur poultry men that are advertising wonderful laying strains selected by the trapnest: Just a bait to catch suckers. Don't be a sucker. Hark to the advice of Dr. Pearl at the close of his Bulletin No. 166, "Inheritance of Fecundity," as follows: "Until this basic question is definitely answered schemes and rules which involve anything further than attention to health, vigor and constitution in the breeding stock lack foundation in ascertained facts." Then we may solve the problem best by culling out the weaklings, breeding from the strong and vigorous, and making the environment congenial.

The difference in the egg laying qualities is primarily the difference in the functional activity of the reproductive organs, and these variations are very largely due to outward conditions.

Of the mature fowl all the evident characters for which she stands are borne into her, but the relative development may be due to the surrounding conditions. It does not stand that because special characters are strongly developed, in an individual they will be transmitted with increased intensity because of extensive development in the parent. The results of good food-nutrition are transmitted to the offspring in the form of vigorous constitution and large powers of assimilation and service. The above are some of the facts that we gather from a careful study of Dr. Davenport's work.

There are some strains of the breeds that are much better producers than other strains it is true. The study into the facts show that the strains of fowls that are known as great producers possess as a race a superior vitality and a very favorable environment.

The housing of the fowls has much to do with vigor, hence effects the profits. Prof. Graham, of Guleph, Canada, tells me that in a five years continuous experiment the hens kept in open front houses have averaged thirty per cent. more eggs than those kept in tight houses. This is in accord with experiments at the Minnesota, Maine, and other Experiment Stations, and my experience bears testimony to the value of fresh air and the open front or fresh air house at all times in the year, Winter and Summer.

I have not yet been able to find a commercial poultry business that has made a permanent success where intensive methods and close yarding has been practiced. This despite the fact many books of secrets and systems are being advertised wherein are wonderful statements of great profits on small areas. Show me one that has made money for the owner for five consecutive years. Colony houses on free range seem to be about the only solution of the problem when it comes to a permanent business for profit in a commercial way.

The houses must be as cheaply constructed as is consistent with convenience and fair durability. At Woodbine Farm the cost of housing is not over thirty cents per head. Many are housed much cheaper than this.

The profits of the poultry business are made not only in securing good prices for the product but in producing the product economically. Economy of production must be closely studied if we solve the problem of profit in the business.

Artificial methods of hatching and rearing the chix must be used where large numbers are desired. The problem of renewing the flocks from year to year is a difficult one. We have solved it fully well by using good vigorous breeding stock and using no eggs over three days old has helped much in getting good hatches of strong vigorous chix. The chix need no feed for at least three days after hatching. The Kansas Station found the best results were to be had by giving the chix no feed till they were ninety hours old. We make the first feed of green grass finely cut; and try to keep as close natural lines as we can. A study of the composition of foodstuffs and animal nutrition has enabled us to so feed as to have the chicks live and grow.

The importance of green grass for growing chix every day from the first feed is not properly appreciated. The food for the growing chick must be highly digestible and contain but little crude fiber and must furnish the elements required for growth. For this reason we use chiefly cracked or pealed corn, beef scrap and a little coarse wheat bran with plenty of green grass and some raw potato. That fool idea of our grandmother that chix can be artificially reared successfully only in small flocks must be abandoned if we get the cost of renewing the flocks down to minimum. For several years we have had excellent success with two hundred under one hover, and this season are trying four hundred and fifty more under one hover in an eight by ten portable house. We use all portable brooder houses that the chicks may each year be reared on clean land.

We deem it highly advisable to have the chix reared on about the same foodstuffs which they will receive when mature. We are sure that better results can be received. Of course we vary the proportions to suit the varying needs of the birds at various stages. After years of close study of the science and practice of feeding and the science of animal nutrition and its application to poultry feeding we are at last able to get the whole thing into very simple form, and yet embody all that science has found out, using an economical ration and getting results. There are three things that are absolutely necessary to the economic production of eggs on the farm, especially in a large way: Namely, open air colony houses on free range and a feed composed of corn, beef scrap and oyster shells. These factors must all be used in combination. We cannot expect results by ignoring one or more of them.

The Kansas Experiment Station found the above combination to produce eggs most economically and it is in perfect accord with our experience. At present we are using a little coarse wheat bran mixed with the dried beef scrap. I am not at all convinced that a variety of expensive foodstuffs is necessary with the fowls on free range. In fact my experience is to the contrary. Neither am I persuaded that laying hens need very much exercise under the above conditions. Probably I am like Josh Billings in that, "I know a whole lot that isn't so."

Some years ago when Prof. Brooks, of Massachusetts Station, made the statement that for best results in feeding for eggs we must eliminate a large part of the crude fiber from the foodstuffs, many would-be poultry experts were not inclined to accept the Professor's statement, which were based upon a lot of original investigation and experiment. I am fully convinced that Prof. Brooks was right. The results at the Kansas Station are further proof to the point. In a ration of corn and beef scrap and the grass and clover from the range, we have a ration with near the minimum of crude fiber, speaking from the practical standpoint: Reducing the crude fiber means a more highly digestible ration.

In every egg produced we have coming together two of the most exhaustive processes in nature—the secretive and the reproductive. It is one of the highest laws of nature that any animal will sacrifice her vigor or even her life if need be to produce a perfect offspring. This law is necessary to the perpetuation of species under the adverse conditions sometimes prevailing in the United States. It is

evident that when the hen is laying a large number of eggs we must study all sides of the problem. The vitality of the hen, the digestibility of the foodstuff, and to the furnishing to the hen everything needed to produce the egg and to maintain the vigor of the fowl. When we neglect these things we cannot hope to realize on the possibilities of the race to the extent we should. I am inclined to the opinion that the absence of shell material is limiting the egg yield of many farm flocks. I have observed hens trying to pick the mortar from the barn foundation in a desperate effort to get a bit of carbonate of lime for shell making. It would be interesting and profitable to follow some of these problems more in detail but time fails me. It is only by working out the details as each individual finds them that great success is assured.

A Member: If a hen lays 200 eggs by the trap method, isn't that an indication that she must have vitality to do that?

MR. CAMPBELL: Isn't it a fact that every egg that hen lays draws upon the vitality of that fowl?

A Member: How are we going to get at this vitality?

MR. CAMPBELL: I am coming to that point. I say the whole thing hinges upon the breeding and selection of our fowls to-day. I would rather have those eggs produced from moderate layers for then I have more vitality and vigor than from the eggs from the heaviest layers.

A Member: Mr. Campbell, in this egg production don't you want to get everything out of the bird that you can?

MR. CAMPBELL: Yes; but I want to have the bird first.

A Member: How soon after hatching would you give chicks water?

MR. CAMPBELL: Under artificial conditions we give them water as soon as we put them into the brooder, forty-eight hours after hatching. I don't think there is a great hurry for water, but I don't think the water would hurt them.

A Member: Do you hatch by artificial means?

MR. CAMPBELL: Yes sir, I do.

A Member: What percentage do you run?

MR. CAMPBELL: Sixty-four per cent. up. I hatch each way.

A Member: If you feed that mixture you speak of don't you find the chicks eat up the corn?

MR. CAMPBELL: We don't have the corn before them all the time. Just as the gentleman who spoke on steer feeding this forenoon, I believe the old hen, if she has the chance to do it, will largely balance her own ration.

A Member: Do you feed corn whole or broken?

MR. CAMPBELL: Whole. Broken corn costs more and your cracked corn is not always corn.

A Member: For the chicks?

MR. CAMPBELL: For little chicks we use the cracked corn and we use some prepared food.

A Member: How do you compound that?

MR. CAMPBELL: Charcoal, beef scrap and corn. We want to get everything needed.

A Member: Mr. Campbell, you use oyster shell all the time?

MR. CAMPBELL: Oh, certainly, because science has proven that carbonate of lime in the oyster shell is the most available.

A Member: Would it not be wise for you to emphasize the fact that that oyster shell is ever so much better if fresh than stale?

MR. CAMPBELL: That possibly may be so.

A Member: How are we to get these pure bred fowls you speak of?

MR. CAMPBELL: The problem is this of starting the flock to-day. If we cannot get or buy that bred and have vitality, let us get at it and select and breed ourselves and we will get it by and by.

MR. PHILLIPS: Then you are not an advocate of interbreeding?

MR. CAMPBELL: That depends, Brother Phillips, a great deal. I am not here to advocate intense interbreeding, especially in farm flocks. It is of benefit and in the hands of careful men is beneficial and all right; but the question is whether we can apply that material as we should. But in selecting a fowl, don't select it because it has down between the toes and five points on the comb, but look whether it is a big strong bird, eyes well set, stands straight on the legs and a few points of that kind.

A Member: Referring to that Maine experiment, don't you think that if they took those hens, the heavy layers the first season, and then the second season not push them for laying before the breeding season and when the breeding season came have them in good shape and plenty of vitality, don't you think they would have gotten vigorous flocks then?

MR. CAMPBELL: They worked on the hens and treated and fed them as nearly alike as possible and the results were as stated in the experiment.

The CHAIRMAN: We will now listen to Mr. W. Theo. Wittman, who will speak to us on the subject of "Some Reasons for Poor Hatches."

Mr. Wittman then delivered the following address:

SOME REASONS FOR POOR HATCHES.

By W. THEO. WITTMAN, *Allentown, Pa.*

Being the last speaker for the afternoon and the hour growing late an endeavor will be made to greatly curtail this address, aiming to touch only the most important or vital points and then lightly or briefly.

The audience will notice that my topic even originally had in mind only touching on "some" of the reasons for poor hatches. It would be utterly impossible in one address to cover all the reasons why eggs hatch poorly or not at all, so intimately is this process of reproduction in the chicken interwoven with the arts of breeding, feeding and keeping. For popular opinion to the contrary, successful poultry craft involves a multitude of details and knowledge, which must be mastered and studied ere we can expect anything like uniform success or a clear understanding of the many principles involved.

Hence it follows that usually to attain any success with poultry, it is necessary to be an enthusiast and have what might be termed "a poultry knack." From this I would not wish anyone to gain the impression though that not a great many more farmers might not take a greater interest in poultry and it is one of my regrets this afternoon as I stand here before you that I lack the personality and oratorical powers to present this poultry problem to you in such a way as to more thoroughly arouse your interest and enthusiasm. Because I am very sincere in my belief that perhaps as many as six in every one hundred farms we have in Pennsylvania could be devoted largely in part or as a whole, to poultry raising and egg production, thus adding many millions of dollars to the annual poultry products of the Commonwealth and to the income accruing to its farmers. For after all when all is said and done whether in speaking of large intensive poultry plants or so-called "systems" for the village and city poultry keeper, the farm is, and always will be, the one place for poultry. The farmer too by thus taking up a line of specialty farming, like poultry keeping, is provided a surer and larger income than is now being obtained by a close adherence to general farming. The work with poultry is not hard; is adapted to many people and is not even difficult to master, if common sense, perseverance and a faithful amount of study and observation be used and thus bring us to one phase of poultry keeping—reasons for poor hatches and all the train of evils and disappointments usually attendant therewith.

Now if we will only remember and be firmly convinced that it is Nature's idea that every egg laid should hatch and every little chick (barring of course, being destroyed by natural enemies) should live and that every departure from this is the fault of man (usually ourselves) the reasons our eggs won't hatch and our little chickens won't live ceases to belong to the realm of the mysterious and becomes something for us to set to work and find out the reason why, or where we have lacked.

Oftentimes the evil results, showing in the failure of our eggs to hatch, are due as much to our sins of commission as omission. An illustration of large proportions of this was afforded all over Pennsylvania in the spring months just gone by. During all of February, the month when the first early chicks arrive, the complaint was general among village, city and farm poultry keepers that eggs were hatching poorly. The reason generally assigned was, the cold and severe winter weather. When Spring opened early and gave an exceptional early and favorable season for poultry on the farm to enjoy free range or lead a normal life or something approaching same, eggs quickly began to hatch well and from all reports I have had, the chicken crop on farms within the State this year is large and doing exceptionally well. But for the village and city poultryman, the long cold winter with snow on the ground almost without a break, greatly aggravated and accentuated the effects of the usual shut-in conditions such poultry is subject to, and poor hatches and bad hatches continued all through April and it is only within this last month that poultry keepers of this class have been getting anything like fair hatches.

In other words, farm eggs generally hatched poor early in the season and eggs from shut in poultry hatched poor until very late in the season. On the other hand I know of some poultrymen whose eggs have hatched well early and late and who have got to the point where they are reasonably sure of this being the rule year by year. These poultrymen did not commit the grave error of simply idly letting the snow and storm of a severe winter rob their poultry of exercise, fuel, pure air, of green and of animal food. These poultry houses were wide open every day the sun was shining and every night it was not storming or too severely cold. Arrangements were such that sunshine flooded the houses and a daily chance at a dust bath was not neglected under ideal conditions. There was a board floor in the house so that the litter, a foot deep thereon, might remain clean and dry. All grain was fed in this litter. So also was grit, oyster shell and coarse beef scraps. Not too much mash was fed and this had a liberal proportion of green cut clover or alfalfa. (By "green" is meant young clover or alfalfa dried in the shade retaining its green color and high value as a substitute for true green food). Any reasonable, thinking person will readily believe that hens thus kept and fed will stay in good breeding condition and will lay strong, hatchable eggs or, in other words, good, meaty table eggs of fine flavor.

For next to the breeding stock, we must consider the egg itself as a prime factor as to whether our hatches are to be good or poor. An egg is simply a new chicken and in direct proportion as to how the egg contents approach ideal proportions to build or nourish a new chick do we get hatching results. For instance, both inner and outer albumens may show too much water or, be in fact, watery. You can't make (hatch) a chick out of such an egg. Or, managing to mature a chick within the shell it may never emerge, or hatching, be a weak chick impossible to raise.

No thinking man can accept the theory that an egg is an egg, even though same be new laid, when the difference on opening two equally fresh eggs may be easily perceptible to the naked eye or in use be differentiated by the quality and flavor.

A poor table egg is a poor hatching egg, excepting of course the more fertile egg, or an egg laid by hens that on the range may have access to food not affecting their health or the vitality or quality of the egg for hatching and yet affecting its flavor as a table egg.

The egg must furnish the elements of growth for the developing chick and if they are not there the germ dies no matter how strong said germ may have been originally.

It will be seen, therefore, that having good eggs it is highly important to preserve the contents of them as nearly as is possible in the condition they were gathered. The easiest and safest way to attain to this is to set them as fresh as possible. During cold weather they simply must be gathered often and I consider a temperature of 60 much safer than one of 40 in which to hold eggs awaiting to be set. To set such eggs on end, to bury them in bran or do similar things to them is worse than foolish. A basket, perhaps lined with paper, is one of the best receptacles and allow eggs always to rest on their sides or in their natural position and turn or roll over every day or two.

On farms the ideal results before spoken of "of every egg hatching" might be more nearly attained if farmers generally would pay only a little more attention to the selection of their breeding males. The male is, weighed in the breeding sense balance, half the flock. He should be the embodiment of vigor, vitality and full flowing health. Without question, a pure-bred and if his owner knows his dam to a certainty and has had him under observation while growing up so much the better. He should be in his prime as to age and in every way thought of, treated and handled as becomes the valuable animal he is. Very old and broken down hens, hens showing they are low in vitality in a farm flock mean, no matter what the male is, or the feeding or the housing, some eggs in every clutch that will fail to hatch. Broadly speaking every farmer would be better off if he would cull his hens one-third to one-half, breeding season or no breeding season, and if he would spend a few dollars in a pure-bred sire or sires.

Next, the great question of incubation. All that has been said up to this may be nullified by faulty incubation. The farmer, carrying a flock of a hundred or less laying hens of the so called general purposes fowl, has no use for an incubator. Or in plainer words, is usually better off without one. Although the veriest tyro may frequently have splendid success with an incubator, the fact remains that the average individual will get better chicks and more of them if he trusts incubation to the old hens instead of dividing it between himself and a heated box. That artificial incubation though is a success in the hands of skilled operators is proved by the immense trade that has grown up in the last few years in day old chicks all of which are hatched artificially. The question of artificial incubation though is too complex and too lengthy to enter into this afternoon, except to mention that the reasons for failure with a certain machine or machines may sometimes be obscure and entirely unsuspected. I found one machine this season that had always done well and which, upon investigation, was simply clogged up with heavy spider webs having been stored on a dirty barn floor.

In conclusion, we heard here this afternoon testimony from half a dozen of you that hens stealing their nests, usually made large hatches. Then let us study the reasons therefor, for reasons there certainly be. For instance let us study the nest. Few of us know how to copy the nests made by this hen. Usually an almost flat hollow in the ground with a few leaves or a little litter made by the hen loosening the earth with her feet, pushing it to a ridge at the sides, moving her breast bone in a circle and pulling in the small amount of litter or lining with her bill.

MR. CLARK: I would like to ask the committee appointed on Resolutions to meet with me in the room to the rear at the close of this meeting. The Committee is W. E. Perham, Sylvester Shaffer, A. J. Kahler, Dr. M. E. Conard and W. A. Crawford. I would like to have some arrangements made for our future meetings and any one who has a resolution to hand to this committee will please hand it in at that time.

DEPUTY SECRETARY MARTIN: Before we adjourn we simply want to call your attention to the program for this evening. Mr. Blyholder will act as Chairman. The subjects of the addresses are "The Farmer and His Recreation," by Rev. Enos H. Hess, of Lancaster. Mr. Hess has had an interval of rest from Farmers' Institute work for five or six years, engaged in work of more importance no doubt. He finally consented to meet with us on this our Annual Meeting. I know you will all be interested in listening to Mr. Hess to-night. Then following this address is "Educational Utility," by Dr. Edwin E. Sparks, President of State College. He needs no word of mine in the way of introduction to you. Then the next subject will be "Agriculture in South America," by Prof. E. M. Baxter, of Mifflinburg, Pa. The meeting this evening will begin at 7.30 o'clock.

The CHAIRMAN: The meeting now stands adjourned until this evening.

Wednesday Evening, May 25, 1910.

Mr. S. S. Blyholder in the Chair.

The CHAIRMAN: We would prefer very much to wait until all were present, but the program being a full one demands that we proceed.

The first subject for this evening is "The Farmer and His Recreation," by Rev. Enos H. Hess, of Lancaster, Pa.

MR. HESS: Ladies and Gentlemen: It is with a great deal of pleasure that I meet with you again as Institute Workers of Pennsylvania. In the ten years that I was absent from the work, I find a number of new faces have come into the fold. The subject, "The Farmer and His Recreation," is one in which we are all interested, and I think perhaps we are having part of that recreation at this meeting.

THE FARMER AND HIS RECREATION.

By ENOS H. HESS, *Lancaster, Pa.*

The farmer is one of the prime factors in a nation's material growth and development. His is the class that not merely manipulates but produces the wealth; the class whose products if withheld for but six months would cause starvation to the peoples of the world; the class that produces the brawn and brain for the leaders of all classes; and, with all, the class that is made the subject of sport by the joker and cartoonist.

A reverend gentleman in giving an address of welcome to a farmer audience indiscreetly referred to the biblical fact of the first murderer being a farmer. The respondent politely told him that only half the truth was stated; that upon that farmer becoming a murderer he was no longer fit to be a farmer and "Cain went and built him a city." Ever since have the cities been the contaminating and destroying influences of the world.

We have never done business in Wall Street nor do we contemplate it. But if one goes to the clothier at present for some garment he is told that all cotton goods have advanced in price on account of the frost. The question arises in one's mind, was it Jack-Frost or Wall Street frost that did the greatest amount of damage. Our government has spent and may well continue to spend large sums of money for the enlightenment and uplift of the farmer through scientific investigations.

Recreation means a giving of fresh life, reanimation, inspiration and diversion; not dissipation, alcoholism, tobacco using and such like so-called but misnamed recreations. The trinity of man, body, mind and spirit, must be kept in mind when considering the proper recreation for the farmer. The student and office laborer may find recreation in a game of golf or tennis, but a farmer secures recreation by a cessation of physical activity. The agitation for the eight-hour system is perhaps uncalled for, the farmer as he usually observes it quite closely. The only trouble is, he too often gets two eight-hour periods in one day.

During the pressure of seed time and harvest, extra effort and long hours are often necessary, but many farmers could, we believe, do better work and in many cases more work if more time were taken for recreation. There is no pleasure in driving a jaded horse; and the farmer who is constantly working to the straining point gets little if any pleasure out of life. The farmer's teams as well as his hands would often be in position to do better service by a shortening of the hours of labor.

Intellectual recreation is quite essential all to the farmer's well being and should be of a higher type than is often to be obtained in neighborhood gossip. We do not wish to exclude all neighborly visitation, but when it becomes too frequent, "familiarity will likely breed contempt." The daily press may be read with profit if done

sparingly. The agricultural press should be and often is a means of new ideas and better methods, if one has enough adaptive ingenuity to assimilate rather than gulp the experiences of others. The same may be said of Experiment Station reports and bulletins. The Farmer's Institute is, if it is all it ought to be in management and speakers, a valuable means of inspiration and education.

If it is true, and we believe it is, that from the farm comes largely the brawn, brain and moral force to run the business of the world, there needs to be enough spiritual dynamics in the farm home to help its best product, the boy; to help build State Capitols without public scandal being connected therewith. One of the most successful lawyers of Lancaster when asked recently the key to his success replied, "His mother's prayers in the old farm home." We may wish to be wholly independent creatures and may profess not to need spiritual recreation through prayer and meditation, but if we do we are as the meteor that has left its proper orb and will meet with disaster as we get into atmospheres with which we cannot cope.

As per the universal law of gravitation for all physical bodies, there is one central force to which it behooves us as dependent, created and yet creative beings to remain attached in order that we may be enabled to work out the best in our lives for which we were intended. Thus, the time spent in church going, attendance at the mid-week prayer service and family prayer and devotion is not misspent but well spent, as it affords recreation to the spiritual life—the motive factor in right living.

The CHAIRMAN: The next subject is "Educational Utility," and I know those of you who have not met the speaker will be glad to meet him this evening, the President of our great State College, Dr. Edwin Earle Sparks.

Dr. Sparks' address is as follows:

EDUCATIONAL UTILITY.

By DR. EDWIN EARLE SPARKS, *President of Pennsylvania State College, State College, Pa.*

My Fellow Workers: I hope that I shall be pardoned this evening if I occupy the few minutes I take in speaking along educational lines. This meeting is educational in its aspects, and I must congratulate Director Martin on the attendance and interest manifested here in this closing of the year's work. Institutes are all educational, and therefore I do not feel out of tune or harmony in speaking along the line of eduaction. Sometimes we complain that education changes and sometimes that no sooner do we get one thing established in the public schools or colleges than we immediately change it; we have the same complaint that as soon as our roads become good we repair them. It is true we make frequent changes; but these changes are simply adjustments to meet the

new demands. We have no candle light here this evening and no one would think of going back to candle light. There is an electrician in this building to look after all these lights, in the days of candle light we had no electricians. I imagine in the olden days we should have had this room heated with a stove which scorched you on one side and froze you on the other side, so that a man might wish himself seated on a turntable. Now the building is steam-heated under the care of an engineer. My point is that there has come a demand for the electrician, and a demand for the engineer; that this change in our environment is constantly going on and as the environment changes so the education must change. It is true it changes slowly sometimes and frequently the need is greatly in advance of the supply, because we cannot determine what will be needed until after the need arises. I might, in this view define education as a constant adjustment to meet new demands made upon us. A few years ago we were satisfied with the bread made by mother; now we demand the best bread that science enables us to make. Then mother was dissatisfied when she had bad luck; now it is a case of thermometer with mother's bread and we have practically come to adjust all education along these lines.

Education has changed more rapidly in the upper portion of the curriculum than in the lower part; that is, our education has adapted itself much more rapidly to the higher demands of life than to the lower demands. The electrical department at the Pennsylvania State College is turning out about fifty electrical engineers this year, and every one has a place now in advance of getting his diploma. There is also a demand along the line of agronomy. We are training six or eight men in that course this year and every man has a position in advance of the time he will graduate. A few years ago there was no course in electricity, agronomy, and a school of Domestic Science was not dreamed of; electro-chemical engineering was not known. These have come, of course, with the demand.

But take the lower grades of the school; is it not true that we are teaching just about the same subjects as fifty years ago? The change has come in the upper part of the line, but not in the lower. They are still parsing, ciphering and memorizing just as they did in the country school when I went there. I sometimes wonder how many of those things I have used since that time. We still have reading, writing and arithmetic as in the old days and I am wondering whether the time is not coming when we will demand a re-adjustment along these lines as we have secured it upon the higher lines. A short time since I was in a conference of school-teachers—I think there were no educators there—all school-teachers and practical people, just as I take it the people you address are all farmers and not agriculturists. There we were discussing these problems and somebody made the statement that all these years we have been giving the same kind of an education to the boy intending to live in the country that we gave to the boy that intended to live in the town. We began to analyze the situation. How many problems in arithmetic will lead the boy back to the farm? You remember the problems; so many yards of cloth at so much a yard. Does that lead the boy back to the farm. We used to have another: Bought 16 2-3 head of sheep. I was always worried about

the 2-3 head of a sheep. I wondered how the farmer got that 2-3 of a sheep home. We had a few problems leading back to the farm but the most of the problems concerned yards of ribbon, of cloth, bookkeeping, accounting, etc.

Now is it not true that nearly every one in this room has his or her ideal. In the school room our chief task is to form ideals. Take the average boy and what is his ideal at present. His ideal is a man not above average height, a near-sighted man who has prominent teeth and a strenuous manner, he is mostly shooting someing; he is generally bursting something. That is the ideal of the boy at the present age, based upon the most prominent man in public life. If you or I could change the ideal of the corrupt politician in Pennsylvania—I don't know if there is such a thing—if you could take the most corrupt politician and change his ideal, get him to believe he ought to work for the public good instead of his private gain, he would cease to be a grafter. You make him realize that public office is a public trust and not, as he believes, that public office is a private graft. As I looked at the 1,400 boys at State College last Sunday I wondered what kind of an ideal was being formed by them. I believe our studies are not more essential in schools than the forming of worthy ideals.

Now take the country boy in school forming his ideals. As he works out his problems does he see himself following the plow? No, he sees himself cavering in my lady's chamber, as Shapespeare says, and measuring off ribbon with his nails brightly manicured. He will not be a clodhopper, he intends to stand behind the counter. Does he see himself back at the farm? Rather he sees himself a bookkeeper, perched on a high stool, totting up columns in a ledger. Take again when we read the reading lesson, Shelly's Ode to the Skylark. Now the skylark is all right on the farm in England. But I question whether an ability to comprehend the poetry of the Skylark, if the lad should ever hear one, would make him a better ploughman. Does that lead the boy back to the farm? How much is there in the reading lesson of the smell of the soil? How much of the dew of the grass, of the odor of the cows coming in at milking time. I claim we ought to have a different education for the boy on the farm from the boy in the city, but thus far I have been on the minority side. Most of the teachers seem to think that education is only for soil-culture and that whatever develops mental powers prepares for the future. Do you suppose that at the State College we give the same course of study to the boy who is going to be a forester that we give to the boy who is going to be a mining engineer? Yet that is what we do in the lower grades.

Let us first find out if possible what the boy intends to do. Let us start on the presumption that the boy intends to live on the farm and the girl intends to stay on the farm. I will not deny the attractiveness of the city. I heartily endorse everything a previous speaker said on the subject. The city has the advantage in comparison with the country; the five cent theatres and the show windows, the music and the lights, all the temptations as well as the legitimate attractions naturally lure boys from the farm. We ought for that very reason to make the country life appear more attractive. Take the boy who graduates from the country schools. He has finished his course up to the eighth grade of the average country school, or, go further, and say finished the township high school. He wants to be a farmer and in-

tends to be a farmer. He has found the blessed ideal of wanting to be a farmer. He knows arithmetic and algebra along the line of mathematics and is going to use his algebra on the farm. How will he use $a^2 + a^2$ on the farm? Will be a better farmer on account of his algebra? Perhaps he has acquired a taste for good reading; blessed is that boy if he has gotten that taste. But how will the appreciation of good literature conduce to judging a horse or a cow? He has studied geography and he knows where the Mountains of the Moon are. Now he proposes to go out and spray an orchard with that information. So far as the school course is concerned he goes out into the orchard and he does not know whether to spray the trees with Florida Water or Bay Rum or Perfume.

The girl when she gets through school has no idea how to dress herself properly; she has no preparation to match colors; and if she has to make a dress she goes and borrows a pattern from a neighbor and fits it to her proportions. If she goes into the store to buy goods, she has to depend upon the honesty of the clerk. "Will these colors run? Is that flimsy or shoddy?" She cannot tell and judge these things as she could do if she had studied domestic art in the school room. In her house she puts pictures of all kinds in all places and she builds a house with a Queen Ann front and a Mary Ann back. That would all be corrected if she had some learning in domestic art.

Are we giving the boy or girl who intends to live on the farm a fair chance in the schools? Here is a boy who has finished his course and can parse from A to Z, but he has not an idea how to put a machine together or take it apart. He could not put up a wind mill. So far as the soil is concerned he cannot tell acid from alkili. Whatever information of that kind he has gotten he has picked up outside of school. The country boy has the same right to get this information, and the country girl has the same right to get her information that the boy who intends to go to college has to get Greek and Latin and he should demand it. I will agree with you that culture is a good factor in life. I will agree that the ability to appreciate good music and works of art adds to the culture of the human soul. But that is not all of education. We cannot live by culture. I should want to have something of what may be called the utility factor of education as well as the cultural side of education. How is this to be done? It will never come save by the demands of the people most interested. Is the city bookkeeper the one most interested in this? He is not interested enough to do anything. Is the counting house man interested? No. You are the ones. It will come precisely from the people interested in agricultural affairs, in rural live.

But there is a preliminary work to be done. Suppose, to illustrate, we take the county superintendent. Suppose you go to him and ask to set the examination questions for the next examination for teachers and he permits you to do so. The first question will be a question on soil testing; the next will be the value of nitrogen in the soil; the next one of the growing of alfalfa; the next on stock judging. How many of his teachers will pass that examination? The next question will be on the buying of goods so as to test good fabrics; the next question will be hand work and basketry;

the making of hats, so that the girl who is going to be a house wife can make these things herself. Probably ten teachers in the county could pass that examination; and whoever passed it would depend upon the general information he had found for himself. The difficulty is to get the teacher who can teach these practical subjects. We have got to begin at the bottom and teach the teacher first and then the teacher will teach the pupils. I believe firmly and fully that we are going to make a revision, but it must be done gradually. We are going to introduce gradually into the country schools of the State of Pennsylvania this very information that I am speaking to you about. But not in an intensive way; we can't set up a laboratory in every country school. Only the essentials can be gained there. You cannot put up an experimental engine in every school; but you can teach the principles of rural engineering there so that the farmer's boy will know something of it. We cannot teach every boy all the different kinds of fruit and budding, etc., but we can get the principles established so that the boy will recognize what is the matter with his fruit tree, so the girl can recognize what is the matter with her rose bush and how to treat it.

These things can be done and I believe will be done by first educating the teachers. In the second place, the utility of education, so far as the college is concerned, faces a standing problem and that has been in trying to get the information from the college to the people. You and I know that the United States government is spending hundreds of thousands of dollars over the United States, giving upwards of $60,000 to the Pennsylvania State College alone, for the purpose of carrying on the experiments in agriculture. How are we to get the results of those experiments to the people? You are the medium largely. You carry out the information from the central office to the distributing point. But the difficulty is, barring your speaking to them, that we have been depending largely on pamphlets. Now, the farmer does not go to the pamphlet naturally for his information. The common idea is that the farmer simply sits in a large easy chair and has nothing else to do but read pamphlets. Perhaps he reads a pamphlet in the Winter and wishes to apply the information; but he has to do something else in the meantime. By the time he gets to seeding his clover, he forgets what he had read about it. In other words, the pamphlet appeals to him at the wrong season of the year, and consequently it has been a slow task of getting the information to the farmer through the pamphlets. How did my father do? I remember as we rode through the country to the camp meeting he and mother would discuss the planting, the farm-buildings and appearance of the farms we passed. I know now that he would rarely come back from the camp meeting without some physical good as well as spiritual good. He was taking notes on the way to and fro. It does not take an observing farmer very long to see how time changes the way of doing things. Yet we tried for a long time through pamphlets to disseminate this information.

The next method was by lectures both in your Institutes and in our instructional trains running through the State. The farmer will gain information much better from the lectures than from the pamphlets; but as a rule even this is not the way he gets information. He was not sent to a college, when he learned how to take notes.

The third way of getting information to the farmer is the way we are now trying to do at the State College and this is to bring the farmer to the college. Do you realize that in the State of Kansas 20,000 farmers visited the State College and every farmer who came there saw something and took away some ideas with him. Think of the men who passed through the dairy building and saw how to keep their milk clean. Few ever saw before in their lives the growth of bacteria as they saw it on the culture glass there. How many farmers before that time had seen the effects of a small piece of cow dung dropped into milk and allowed to stay for twenty-four hours. When the farmer sees that he learns the value of clean milk. When he goes over the experimental plots at The Pennsylvania State College,—some of them twenty-eight years old; that is for twenty-eight years these have had a rotation of crops, first one crop and then another, some with various kinds of fertilizer and others which have never had a particle of manure or commercial fertilizer and these he sees all grown over with red top; and next to it perhaps is the plot that has had only barnyard manure. He sees all these plots and he gets a lesson and he goes home convinced; and to my mind with a thousand pamphlets or 500 lectures you would not convince him the way going there and seeing it himself would convince him. For that reason we are trying for better railroad facilities at State College, and I am taking this opportunity to advertise to that extent; I want your help. We are after the Pennsylvania Railroad Company. We are camping on their front steps at present, trying to get better railroad connections. Nine miles of railroad built over a sandy region of comparatively level ground would connect us with the main line at Tyrone.

I met a man the other day at Clearfield, who told me that he went over to the State College winter before last and stayed there during Farmers' Week. That was six days. He said that he came home and that year increased his strawberry crop five times. Just one week of six days he was there. I want the help of all of you as far as your influence goes with the Pennsylvania officials. We had twenty of their leading men at the college this week. They know that the railroad has got to haul something besides people in order to pay dividends. They have hauled about all the timber they will haul out of Pennsylvania for some years. They know that the mining resources are exhaustible. What else is the road going to haul? It must depend upon what it produces from the soil because that is everlasting. The farmer is the producer. The railroads understand that now. I suppose there are twelve demands on file now at the college to run these farmers' instruction trains over different roads in this State. Every division superintendent is alive to this.

To-morrow there will arrive at the Pennsylvania State College forty-five men coming in a special train from the Cumberland Valley. They are going to stay there two days. Who are they? They are the station agents, and the railroad is sending them there at its own expense and going to keep them there for two days. Why? So they can go back home and be agricultural missionaries. They expect these station agents to tell the farmers what they have seen at State College. They are wakening up to that. I want your help as far as it may be in this thought of trying to get them better rail-

road facilities so that the people may reach the college and get their information direct and in that way your work will be supplemented by their personal observation.

Another point I want to make. We are coming to another session of the State Legislature. The Pennsylvania State College is a dependent State institution. It has no permanent endowment. The proceeds of the $12,000 Mr. Carnegie gave, goes to pay the room rent and incidentals of the scholarships. From the United States government land grant proceeds, the State pays the interest on $500,000. What a pitiful foundation for the child of the rich State of Pennsylvania. Yesterday I read that Princeton gets $10,000,000. If we only could get one million. Who is going to give us $10,000,000? The colleges that get the money are located in or near the cities and the money is in the cities. If the man in the country does make money he takes the first train for the city. We cannot expect much in this State in the way of endowment. We have to depend year after year on the session of the General Assembly and you men and women have been loyal in your support of your State College. The criticism is they say we demand more and more money. Why? Because the students are coming more and more to this free school. Do you realize that the attendance has doubled in five years? Every additional student is an additional burden because he does not pay any tuition? If we could get an average of $900 a year for 1,400 students the problem of maintenance would be solved. We had 453 Freshmen enter this last year. Next year it looks like 600. We have recitation rooms in the garrets and basements and everywhere trying to take care of them. We don't want to turn them away. This increased sum of money has got to go for an increased number of teachers, increased machinery. Some of the buildings are good imitations of wooden structures, with tarpaper roofs,—temporary buildings. And above all the School of Agriculture is growing! Over 400 students this year and twenty-five graduates. Everyone of the graduates has a position now in advance,—a greater demand than can be filled,—and how are we going to take care of the additional agricultural students next year? We must have more buildings and they must come from the Legislature through your support.

I find you have a lantern here and I want to show one or two slides and make a practical illustration of our crowded condition.

(A number of slides, showing interior of the various buildings, were thrown on the screen with appropriate explanations by the speaker.)

MR. PERHAM: Mr. Chairman, I would like to make a suggestion, that he repeat the proposition that President Sparks made at Harrisburg last winter in regard to what they expect to do for the school teachers during the summer vacation.

DR. SPARKS: That is the very heighth of courtesy. I said that it is necessary in the first place to teach the teachers these practical subjects because the teacher is not taught them. We have a vacation beginning the middle of June and lasting until the middle of September. The State plant is valued at nearly $2,000,000. It includes about 600 acres of ground and about forty buildings. No

manufacturing concern with a plant valued at $2,000,000 would think of closing up for three months in the year. We propose to utilize that plant during half the three months of this summer by having a summer session for teachers. No tuition will be charged. Board can be secured for about $3.00 and a room for $1.50 a week. We are going to have regular sessions and studies and we are going to try to teach the teachers who come to us by using the laboratories and shops. We are going to charge a fee of $5.00 for registration for the reason that no one who gets something for nothing will appreciate it fully. That is all the cost there is besides the cost of subsistence and railroad fare. For instance, we shall teach elementary agriculture three hours a day for six weeks. What can a teacher get in that time? A great deal of the essentials. We shall have afternoon lectures on the chemical effect on soils and the application of these different arts of agriculture. In the course on domestic science, we shall have six weeks on the quality of foods, fabrics, etc. We are going to have a six weeks course of manual training in the shops, and in elementary chemistry and elementary physics. We shall have some English language, it is true, and a course in German; but we are going to lay all stress on these practical subjects like agriculture. How we can get the teachers to come there is to ask you to help do that. I have estimated that $35.00 in addition to car fare will be all it will cost; and where is the teacher who cannot spare $35.00? And I believe it would pay every board of directors in the State of Pennsylvania to pay the $35.00 and send the teachers there. It will be one of the best investments that could be made. I don't know whether it can be done by law but, if not, it ought to be done by subscriptions. I hope the Grangers will in time offer summer scholarships to the country teachers.

MISS BAKER: Mr. Chairman, may we ask Dr. Sparks the date of the first day of these six weeks; also who may be considered teachers?

DR. SPARKS: It will begin on the first Monday after the middle of the month of June. That will be the 20th, and it will run until the first day of August, leaving the month of August for recreation.

Who are considered teachers? Any one who holds a certificate to teach in the schools of Pennsylvania or who has taught or is teaching in the State of Pennsylvania. I may go on and say all who intend to teach in the State of Pennsylvania. For those who are outside the State we thought since it is a State school we ought not to spend State money for them. Those who are not Pennsylvania teachers will be charged $20.00 tuition.

MISS BAKER: That would include the teachers of this body—the $20.00?

DR. SPARKS: Oh, yes.

MISS BAKER: This body?

DR. SPARKS: Anybody who could read and write.

The CHAIRMAN: The next subject is "Agriculture in South America," by Prof. E. M. Baxter, of Mifflinburg, Pa.

Mr. Baxter then delivered his address as follows:

SOUTH AMERICAN AGRICULTURE.

By E. M. BAXTER, A. M., B. S. A., *Mifflinburg, Pa.*
Ex-Chief Argentine National Department of Agriculture. Formerly Agricultural Editor Buenos Ayres Herald.

You are aware, of course, that the great highland region of South America lies close to the Pacific Ocean. It varies in width from about one hundred to more than six hundred miles, and extends from the far north to the extreme south of the continent. In many places it rises with considerable abruptness from the Pacific to heights varying from a few hundred to several thousand feet, seamed with deep gorges and gullies cut by the torrents which have their origin in the melting snows and glaciers of the Arctic summits of the Andes.

The highlands of the east, the lesser system of the continent, are roughly triangular in form, the sides of the triangle being nearly equal in length. One side faces the Atlantic for a distance of some two thousand miles, having the angle opposite over fifteen hundred miles from the coast, near the point where the falls of the Madeira obstruct river navigation into Bolivia. The eastern highlands are much lower than the western, have only about half their area, and are chiefly within the tropics.

A large part of the continent is lowland less than a thousand feet above the level of the sea. In some sections the lowland is very flat, but generally its surface is marked by a great diversity of hill and valley. It extends from about six degrees north of the equator to forty degrees south. Much of the western highland is barren, but the pocket-like expansions of the valleys where irrigation may be practiced, and the foothills on the east, the total aggregating only a relatively small area, however, are fertile, in places extremely so.

A narrow belt of desert, alkaline and saline in nature, in places more than three hundred miles wide, lies on the lower slopes of the Andes and the lowlands to their east, extending from within the tropics almost to the Straits of Magellan. Wherever irrigation is possible in this barren region bountiful crops may be produced.

The lowlands and eastern highlands are characterized by great tracts of forests, and vast, treeless, grassy plains. Swamps thick with rank reeds and other coarse water plants are common. In places the forests are open, offering only slight obstacles to horseback travel, but in many extensive districts the trees, shrubs, and vines are so intergrown that the explorer must cut his way through with ax and knife. On the plains there are great areas having so dense a growth of tall grasses or thistles, wild pineapples or other matted annuals, that the horseman finds it almost or quite impossible to force his mount through.

Springs are not as numerous as they are in our own Alleghenies, but there are many cascades and waterfalls in the mountains, both east and west. Nearly all the larger streams overflow their wide,

level valleys every year, the flood period corresponding to the period of heaviest rainfall in the wet season, a period generally lasting several weeks.

Although the major part of South America is in the torrid zone, there is a temperate region comparable in extent with the United States or Europe. The temperate region includes the upper plateaus and valleys of the Andes within the tropics, a small part of the tropical eastern highlands, and all of the continent south of Capricorn, with the exception of the Andean summits. That is, temperate South America comprises a large part of Venezuela, Columbia, Ecuador, Peru, and Bolivia; a small part of Brazil; and practically all of Chile, Uruguay, and Argentina.

Naturally, the agriculture of the vast tropical territory of South America is limited to the products of the torrid zone, products to which the American husbandman gives little direct attention because they are so different from his own crops. On the other hand, the farmers of the United States are becoming more or less concerned in the possible products of temperate South America because of the reiterated reports that the cheaply produced grains and meats of this territory are on the point of gaining control of the foreign markets we have come to look upon as our own, and because of their supposed likelihood to invade our domestic markets within a very few years. We shall see shortly how little foundation there is for these predictions. Throughout all the great temperate territory of the continent, a region of a thousand million acres, all the field, orchard, and garden crops, and all the domestic farm animals, of temperate climes will thrive. Here is a domain capable of feeding and clothing well hundreds of millions of people, yet anomalously the continent's sparse population of barely sixty million draws a considerable part of its food and clothing from foreign farms.

Cattle graze over all parts of temperate South America, and in the open forests of Brazil and Paraguay, not wild and unclaimed as was the case a few decades ago, but in branded herds that are coming to be cared for and managed with no inconsiderable skill by many ranchmen, although some still receive only the most primitive attention. No reliable information is available from which to determine with any degree of accuracy the number of these cattle. They can hardly exceed 50,000,000 head, and possibly are no more than 35,000,000.

North of the Tropic of Capricorn inferior sheep are found in small numbers, but farther south they feed in ever increasing flocks of better breeds. They number not over 120,000,000 head, and may be even less than 100,000,000.

Horses run wild or half wild throughout the temperate parts of the continent, but in the tropics they are rare, speedily succumbing in all hot districts to a disease known as *mal de cadera,* a malady probably carried by blood-sucking insects. It is doubtful if there are 15,000,000 horses in all. There are probably 5,000,000 or 6,000,000 mules and asses, the former being generally used instead of horses in all inhabited regions of high temperature.

Swine have taken to every part of the continent settled by the whites, they thrive nearly everywhere, yet it is likely that there are less than 5,000,000 all told, with little if any annual gain in numbers.

There are goats up to 2,000,000 or 3,000,000, kept for their flesh and skins, and there are 20,000,000 or more head of poultry—turkeys, geese, ducks and fowls.

The staple grains, vegetables and fruits are unknown as farm crops in most parts of South America. Many different varieties are sparingly grown in small garden plots, partially to meet private needs, but practically the only region in which they have gained an economic place of more than local importance is the Pampas of Argentina and Uruguay.

The Pampas is the region from which have come the wonderful stories of the meteoric rise of South American agriculture. Here is the territory, which, according to some vision-seeing travelers and writers, will soon force the farmers of other lands into a condition scarcely better than serfdom, for these seers already see the Pampas producing unlimited quantities of meats and grains, butter and cheese, fruits and vegetables, wool and hides, flax and cotton, at prices so low that even the poorest of the world may be fed and clothed like princes. Without question the Pampas is the key to the South American agriculture of the present, and it will remain the key for several generations, at least. It has a genial climate; a fairly fertile soil all ready for the plow, although subject to long periods of drought and the devastation of great swarms of grasshoppers; all sections are within easy access of river and ocean; and life and property are as secure there as in any other part of the continent, indeed, more secure, than in many other districts.

The other sections of temperate South America are also rich in climate and soil, but they are difficult of access; their sparse population is generally antagonistic to foreigners and uncongenial to people reared under the enlightenment of the United States or Europe; and the life and property of the alien are far from safe, especially outside the policed districts of the larger towns and cities.

During the last seventy-five or eighty years small numbers of men from our own country and greater numbers from Europe have gone into the temperate districts to engage in farming, generally in ranching, except that some have "taken up" grain growing in recent years on the Pampas, with a liberal measure of success, but at the sacrifice of most of the amenities of civilization, living and rearing their children far from the refining influences of people of even moderate culture, and subject to the bestial practices of a degenerate Christianity.

For instance, in eastern Bolivia there is a family of north European stock, stock which in the United States has produced men of the highest standing, living hardly better than the debased "greasers" of our own Southwest, although "rolling" in wealth. About forty years ago this man and his wife emigrated, taking with them a few hundred dollars, and ascending the mighty La Plata far into the interior of the continent, lured by the glowing prospects of becoming great land owners and stock raisers. They bought land at a fraction of a cent an acre, a few score cattle were purchased for hardly more dollars than there were animals, the necessary horses were procured for the proverbial song, and the road to wealth lay before them—if all went well. They shrewdly managed to make friends of the few people, especially the government officials, in the wilds about them, thus escaping much of the open plundering generally meeted out to foreigners living as they did.

From a fifteen-by-fifteen hut their dwelling gradually grew into a cheerless, uncouth, rambling, low structure of half a dozen scantily furnished rooms; children were born to them; livestock multiplied; and their acres broadened. Here we have practically the sum of their existence; not a friend nor an influence to help lift them above the lowest plane of a white man's life. They have an abundance of lands and stock; they have gluttonously fed bodies; they have dwarfed intellects; and they are destitute of all the finer things of modern, civilized life. I leave you to say how desirable is such success.

Down on the Pampas, not far from the fair city of Buenos Ayres, in much the best district of all South America for the farmer of any degree of refinement, is a family which was established there almost a hundred years ago. The first of this Argentine line was also from the north of Europe. Without money, he began to work his way upwards by herding sheep "on shares." He "knew sheep," he was ambitious, and he believed the Pampas was destined to have a bright, if not a brilliant, future. Every dollar earned was put into sheep at first, then cattle, which were for some years grazed on the public lands without any payment for rent. Later on, with the accumulation of tens of thousands of head of stock, land was bought in large tracts at only a few dollars per hundred acres, until a property in excess of two million acres was in hand. In the meantime a wife had been brought out from the home land, a comfortable dwelling was erected, teachers were employed at home for the children, intercourse was maintained with congenial friends, and a touch, although rather loose, was kept on the progress of the world through books and periodicals. Occasional visits were made to Europe, and when the boys were ready to go to college they were sent to the best institutions in the Old World. They in turn made provision for their children to advance a little farther on the road of progress than they themselves had gone, so that to-day, the families of this line, although not in the inner circle of the aristocracy of the country, are persons of intelligence as well as of means. Their notions of life show the taint of the people among whom they dwell, yet they are very much superior intellectually and morally to the family referred to above.

But for every instance of success on the part of foreign farmers, there are scores, aye, hundreds, of instances of heartbreaking failure, failure not due to any lack of effort or spirit on the part of the immigrants, but to the tricking of the "natives" about them. It would be possible to tell you the pathetic stories of hundreds of individuals, and even of numerous colonies numbering dozens of families each, who were lured into one country or another in South America in the not very distant past under promises of special government aid, and with apparently golden prospects, only to discover eventually that they were the "game" of men scarcely less diabolical than their ancestors, the "*Conquistadores*," who ruthlessly drove the Indians under the lash into the mines and forests to wrest from ore and tree the fortunes craved by them.

One example only can be given. Some years ago a number of men of high estate in one of the Andean countries devised a scheme to increase their fortunes without expense to themselves. Their plan was to have the government enact a law whereby the nation should pay the passage of several hundred immigrants from Europe, pro-

vide funds for their maintenance until they became self-supporting, and supply them gratis with the equipment necessary to establish them on virgin land and convert it into tilled farms. The immigrants were to be colonized on the lands of such citizens as might make provision to conform to certain conditions specified in the act.

Several of the schemers crossed the Atlantic to act as agents for the *combine* among the peasants and small farmers of Central Europe. The offers and promises made by the agents were so liberal, and their claims to be acting for their government seemed so convincing, that would-be emigrants were eager to go to the *El Dorado* pointed out to them. The agents reported their success to their fellow schemers, and the bill was presented to Congress and speedily became law. In the meantime the agents in Europe selected the several score families provided for in the measure, and laid their plans so that within a few weeks after they received word from their confederates at home that the law was on the statute book they embarked with their colonists.

On arriving at their destination in South America each immigrant family was placed on a tract of land varying in size from fifty to two hundred acres, according to the number of persons in the family, the understanding on the part of the settlers being that the land was sold to them subject to payment in a number of annual instalments out of the proceeds of their toil. For several years all went well with the colonists; there were no taxes, as the agents had promised; the land was brought under cultivation; buildings, some of them good brick dwellings, were erected, and tobacco, cotton, sugar cane, the vine, coffee, and other crops and fruits were planted. Prosperity seemed to smile benignly on the immigrants, and they "blessed the lucky star" which led them to this eden.

But about the time the vines and coffee trees began to bear well and the land was giving assurance of bountiful crops, clouds rose rapidly above the horizon on all sides. One or two of the boys of each family was conscripted into the army. Several of these were only sixteen years old. Next, a poll tax of several dollars was laid on each member of every one of the immigrant families. Then, a number of the girls were forcibly taken as servants in certain of the families of high government officials, receiving no wages, and being placed on the level of concubines. When the period came to a close during which the colonists were making yearly payments towards the purchase of their farms, as they supposed, and they asked for their titles, they were informed that the payments had been made as rent, not as purchase money. Furthermore, the farmers were notified that a material increase in the yearly payments would be required of them thereafter, otherwise they would have to vacate the properties held by them. Naturally, the colonists were alarmed and indignant at this turn of affairs, but they soon discovered that the schemers had everything legally in their own favor. The farmers had no disinterested evidence that they were to be exempt from taxes, that their sons were not to be conscripted into the army nor their daughters *employed* as household servants, or that the annual payments made by them were purchase installments and not rent. On the other hand, the schemers had an array of documents signed by the farmers themselves showing that everything done was done in accordance with the agreements made by the farmers over their own

signatures. Appeals to the courts and consuls were therefore fruitless. Despoiled of numbers of their children, and robbed of the toil of several years, the colonists were forced to remain practically as serfs on the land they had developed, for there was almost no opportunity to secure work elsewhere, and there was nothing they could convert into money with which to flee from the region and country which had treated them so foully. Eventually some drifted off to other parts of the country, and a very few succeeded in getting away to other lands, but most of those who survived the calamitous ending of their aspirations are to-day dragging out a miserable existence under conditions far worse than those of the gentry-ridden lands of their nativity.

It is only fair to say that during more recent years conditions in most South American countries have improved to such a degree that there are very few in which such brazen plundering schemes as that outlined are likely to be tolerated now or in the future. Many parts of the continent have come to recognize the desirability of standing higher in the world's public opinion than they stood in the past, an opinion which demands that foreigners of all classes be given a "square deal" in any and every country. The Pampas is in the forefront of this change towards immigrants, because this region has the most extensive commercial relations of all South America with lands across the ocean, and Pampas land owners are beginning to see the great material advantages which they are likely to derive from the development of their country through the investment of foreign capital in industrial pursuits.

All through the centuries since its discovery, explorers and colonists have been taking domesticated plants and animals in small numbers to South America. Until very recently the new environment, in most cases, was so different from the old that plants and animals generally were unfavorably affected by the change, selections having been made without regard to the peculiarities of the regions to which they were transplanted. Thus, Old World varieties and breeds were commonly disappointing, leading gradually to the belief that the soil and climate of South America are unsuited to very many of the plants and animals of the north temperate zone, the plants and animals of greatest economic importance to the world.

For instance, wheat was tried in many parts of the continent, always proving a failure for milling purposes until suitable seed was "accidentally discovered" a few years ago. Corn, although grown in small plots by the Indians for centuries, after almost innumerable attempts at field production in widely separated districts, came to be looked upon as an impossible commercial crop. Alfalfa, clover, timothy, blue grass, and other well known pasture and meadow plants, seemed unable to get a hold on farm land. The fruits and vegetables common to our latitudes, with few exceptions, became coarse and insipid under most South American conditions of growth. For centuries there have been cattle, sheep, and poultry in great numbers in most parts of the continent, but their flesh had not the tenderness, the flavor nor the nutritive qualities of meats produced under modern conditions in lands long under cultivation.

Early last century an American, one of the small number of our compatriots who have found the route to South America, was instrumental in getting a number of Merino sheep from Spain into the Pampas, in the hopes of securing a better and heavier clip of wool. Although there was improvement in every flock into which this new blood was taken, the financial outcome of the move was not encouraging. Monetary rewards there finally were, but they came not to him who promoted the improvement but to his successors, when, in later years, the foreign demand arose for more and finer wool. To-day there are probably 40,000,000 sheep affected by this and more recent importations of Merino stock, some of them from the United States, and nearly as many more millions improved by other pure stock imported since the early eighties of last century. Some of the best pure bred sheep of the world are now on the ranches of the Pampas, where the prices of superior sires range from $2,000 to $5,000, in the current coin of the United States, with chief honors about equally divided between the Rambouillet and Lincoln. The former is demanded on ranches distant from the packing houses where fine wool is the aim, and the latter on properties convenient to railway and steamer, with a desire for large carcasses of mutton. All of Europe's chief breeds of sheep are now being tried out intelligently on the Pampas under skilled Old World stockmen, with indications that several besides the Rambouillet and Lincoln will make a worthy place for themselves there.

Sixty or seventy years ago a Briton who had been some time in Argentina engaged in stock farming had a Shorthorn sire sent out from England, chiefly for the purpose of securing better beef for his own table. In this case, as in that of the Merino sheep, the experiment was not satisfactory from an economic standpoint. The progeny of the imported sire were superior to native stock in size and quality of flesh, but there was too little gain in sales to induce further improvement at that time. Later on, however, the monetary importance of high class stock became manifest, leading to an insistent demand for pure bred sires at exorbitant prices, the range having run from $5,000 to $17,000, American money.

The success of the Shorthorn in the clever hands of stockmen of British extraction soon led to the trial of other breeds, with the result that most of those best known in Europe have been imported in considerable numbers. Several of these are apparently adapting themselves marvelously well to the peculiar conditions of Pampas ranching, especially since it has been found that the cereals and cultivated clovers and grasses can be luxuriantly grown there. As a result of the activity in the improvement of cattle during the last fifteen or twenty years there are now tens of thousands of pure bred stock, and millions of cross bred in South America, with the outlook bright for the continuation of the movement until every part of the continent has been lifted above the mediocrity of the past.

As evidence of what has already been done in the improvement of stock, I may refer to one estate in the Pampas, not one of the great estates, either, which has some 35,000 Herefords, 85,000 Shorthorns, 140,000 sheep of a half dozen breeds, and more than 6,000 horses, Thoroughbred, Hackney, Shire, Clyde, and Suffolk Punch; every animal, with hardly an exception pure bred and "home raised."

Occasional efforts have long been made to improve the saddle horses of the continent, all horses until well within the present generation, having been used for riding when used at all, except the insignificant few used in cities. Incidentally, surplus and culls furnished hair, hoofs, hides, and tallow for export. The improvement, however, was at no time general, chiefly because the only markets were local, with a very limited demand for a really good horse. In a few instances coach and draft horses were experimented with but without adequate financial rewards until within the last dozen years. As saddle racing has ever been one of the chief amusements of South Americans it is not surprising that the improvement of running horses received more attention prior to the close of last century than any other class, but even here advance was confined to a small number of the most wealthy urban districts. Thirty or forty years ago a bunch of Morgan horses was taken to the Pampas, but they were not especially profitable to the enthusiastic admirer of the breed who imported them from his native land, although one may to-day discern the Morgan characteristics in the best carriage horses of Buenos Ayres. With present-day means of quickly and safely reaching the markets of the Old World, experiments are being made with the best European breeds of horses. The outlook is very favorable for the utility of a number of these in different parts of the continent from which horses are not barred by the diseases of hot latitudes.

One of the Pampas surprises to the foreigner is the great annual stock show held in the suburbs of Buenos Ayres. About 3,000 cattle of the beef breeds, preponderatingly Shorthorns, are on exhibition, as well as hundreds of sheep, sometimes nearly 4,000 of them, chiefly Rambouillets and Lincolns, with a sprinkling, however, of eight or ten other breeds. There are usually from 600 to 700 horses, less than half a hundred dairy cattle, a score or so of swine, a few pens of poultry, and frequently some dairy and crop exhibits. For example, there was one year a display of Argentine-grown tobacco, cotton, silk, and fruits that would have attracted marked attention in New York or London. There are also vast displays of implements and machines, for the Pampas needs constantly increasing quantities of the best that our inventors and manufacturers can produce. The show is made one of the notable events of the season, attended by high government officials, foreign diplomats, and the leaders of society, for the wealth of most native Argentines, the aristocrats of the country, lies in their lands and live stock.

Late in the sixties of last century some Swiss colonists discovered that some of the Mediterranean wheats would yield fair crops on their Pampas farms. Their success gradually led to experiments with similar seed in other districts, the outcome being equally good, and proving that excellent crops are possible in a territory comprehending many million acres. To-day a part of the Pampas, only a fraction of the great possible wheat zone of the continent, is exporting millions of bushels of high grade wheat every year, besides producing its own bread.

About the time the possibilities of profitable wheat growing were being proved, an American, a former Kentuckian, having a ranch not far from the Swiss colonists referred to above, planted several

acres to corn, using seed from his native State. He harvested a crop that averaged a little more than sixty bushels an acre, indisputable evidence that corn can be grown with profit if the right man is at the plow. The news of this crop was carried on the wings of the wind to all sections of the Pampas, and even beyond, and within a few years scores of other husbandmen demonstrated the general adaptability of Pampas soil and climate to the production of corn of suitable varieties. As a result, millions of bushels of the king of cereals are yearly sent abroad, hardly more than that required for seed being consumed internally.

Another American, a Californian, who went prospecting among the grazing lands of the Pampas, saw in the suburbs of every town and village small plots of the finest alfalfa, but not an acre on any of the ranches. On inquiring why alfalfa was grown only in gardens he was told that it would not thrive on the ranch. Having raised alfalfa all his life he had his opinion of this explanation. Certain, now, of the exceptional adaptability of the Pampas for stock raising, he continued his search, found a frontier property of many thousand acres to his liking, bought it at a few cents an acre, and made speedy preparations to seed a hundred acres to alfalfa. Neighbors advised him that his efforts would be fruitless, for had they not heard all their lives that the ranch would not grow this best of forage plants. His experience with alfalfa in his former home led him to persist in his course despite the forebodings of his new friends. His experiment was brilliantly successful, and to-day he has about 70,000 acres in alfalfa. Moreover, he has yet to turn under the first acre of alfalfa sod.

This experiment, made some forty years ago, induced others to do likewise, the result being that there are now millions of acres of alfalfa on the Pampas. Naturally, for a number of years there was a good deal of doubt concerning the possibility of growing the crop in other districts, so deep-rooted was the belief that it could not be raised in ordinary soil under ordinary farm conditions. But here and there a man was bold enough to go counter to the long established notion, the successful efforts of all these experiments making it certain that every part of the Pampas is unusually well adapted to the production of alfalfa.

Some of the great estates now have over 200,000 acres each in alfalfa, and thousands of smaller ranches each have thousands and tens of thousands of acres. Don't think Smith of Texas, with his little patch of 1,500 acres or Jones of California, with 2,500 acres, is the "alfalfa king" of the world, as some of our papers boastingly proclaim. The "king" is in Argentina, the country which leads the world in the acreage and production of alfalfa, for in the most favored sections of Argentina during mid-season a crop of alfalfa grows in from twenty-two to twenty-seven days, and nine cuttings are made in the year, giving a yield of cured hay ranging from twelve to nearly twenty tons an acre. In the greater part of the country there are from five to seven cuttings a year, averaging from eight to twelve tons of hay annually per acre. If Clark of Connecticut, with his wonderful knack in growing grass and clover, were in the best part of Argentina he would soon get from thirty to forty tons of alfalfa hay to the acre, for he would have all the advantage of marvelously helpful climate and soil.

Hardly a third of a century ago still another American, a civil engineer who went out to the Pampas to engage in railway construction, saw an unprecedented opening for dairying. Cows swarmed over the plains yet he could get neither milk for the kitchen nor cream for his coffee. The butter set before him was all imported in sealed tins from Europe, and, with the exception of a very unappetizing domestic make, all the cheese was the product of dairies on the far side of the Atlantic. Not a dairy could the engineer "get on track of" anywhere on the continent, so he saved his salary and bided his time to buy a ranch. Having no practical knowledge of dairying when finally in possession of his property he selected Jerseys for his herd, probably the poorest choice that could have been made for the district in which his ranch is situated. But despite this handicap money flowed in from the first milking, leading in a few years to a fortune of several hundred thousand dollars, and also leading in less than two decades to a national dairy industry, exporting millions of pounds of butter and cheese annually.

These Pampas developments in the improvement of livestock, in the production of cereals, and in the conversion of beef cows to dairy purposes, are the foundation of the reports of the wonderful productivity of South American soil and climate, and of the prediction that in another decade the farmers of South America will dominate the markets of the world. If the continent had maintained the gains shown in the exports of farm products from 1885 to 1900, there can be no doubt that before 1920 it would have driven the United States, Canada, Australia, and India out of all European markets, with an equal certainty that our own domestic market would have been flooded with its great crops. But a close study of the conditions under which the development of Pampas agriculture took place shows that these conditions were unusually abnormal, making the gains in the exports of farm products during the period in question equally abnormal. The culmination of this spectacular development was reached in the first years of the present century, from which time there have been only slight gains in the exports of the surplus of the soil from the La Plata countries. Moreover, there is no likelihood that there will ever again be any very considerable gain in the yearly rate of increase in crop production.

Prior to about 1870 the farmers of the Pampas were all ranchmen, as the husbandmen of most other parts of the continent were and still are. Then, there was a vast public domain, looked upon as being almost worthless, free to the stock of whomsoever cared to go beyond the frontier of settlement for pasture. Only the land along the coast and great rivers was thought to be worth buying up for ranch purposes until after the construction of railroads, when settlers slowly followed these new means of transportation. Ranches were unfenced, the great flocks and herds being cared for by mounted men and boys who were hired for a few dollars each per year in addition to a hut, a plot of ground on which to raise the common vegetables, and fresh meat from the animals they guarded. Every man who worked on the farm was employed about stock in one way or another, and every immigrant farm hand found that the only work in which he could engage was the care of stock.

At this time the population of the Pampas, a territory nearly half as large as the United States, was less than 5,000,000 people, over

a quarter of whom lived in the cities and larger towns, and had no connection with farm life. Thus, when it was demonstrated that livestock could be profitably improved, that the cereals would yield excellent returns, and that dairying might be advantageously developed, there were less than 4,000,000 persons, a large proportion of whom were children under fifteen years of age, to do all the farm work undertaken, no matter what its nature. This population, sparse as it was, was considerably in excess of the actual needs of ranching under the method then followed. Families were large, fifteen children in any not exciting special comment, so the women and girls, who were generally expert with spindle, loom, and needle, made the family clothes, and sewed and embroidered as a means of aiding in supplying the necessities of life.

On the discovery that the cereals could be grown, great numbers of men and boys were taken from the saddle to follow the plow, women and girls were also made to do all kinds of work in connection with the cultivated crops, and farm immigrants, with the exception of those skilled in handling stock, found employment as tillers of the soil rather than as hands on the ranch. This change in vocation was made with marvelous rapidity, for by 1900 every woman and girl that could be pressed into service, and every hand that could be taken from the care of cattle and sheep, was engaged in producing wheat, corn and flax. Meanwhile, hundreds of thousands of miles of wire fence were built, not only making it possible to care for stock in accordance with the better methods demanded by the improvement in breeds, and with the minimum of "help," but also, for the first time in Pampas practice, enabling the herdsmen to group animals in suitable classes or grades, instead of having all ages and conditions on each ranch in one great herd.

As long as men could be readily transferred from the pasture to the grain field the increase in the production and export of Pampas cereals could be and was exceedingly rapid, but as soon as the limit of this transferred labor was reached, just so soon was the phenominal gains in crops and exports brought to an end. Extraordinary efforts were made by many land owners to maintain the rate of development by the further use of the wire fence, by the greater use of American labor-saving implements and machines, and especially by constantly increasing the wages of the tillers of the soil. Wages rose in little more than a decade until they were on a par with the pay given in our own country for the same classes of work, and the demands of harvest hands quadrupled, and even quintupled, in the last seven or eight years of the period of development, in the efforts of husbandmen to secure the help necessary to garner their huge fields of ripening grain, which, in some cases, exceeded 30,000 acres each.

The increase in wages, together with other increased expenses, raised very materially the cost of production, so that this, in connection with the frequent losses caused by drought and grasshopper, made it impossible to secure profitable harvests from a great deal of land that a few years earlier was regarded as satisfactory in its returns. For instance, in 1890 a yield of five bushels of wheat to the acre gave the grower fair profits under the conditions of that time, for each plow could fit the ground for from three hundred to five hundred acres, per season and fifteen hundred bushels at sixty

cents a bushel gave the grower some $300 profit. Now, to a family which before this had hardly earned $300 in a lifetime, a five-bushel-an-acre crop on three hundred acres was a small fortune. In 1900 the cost of production had risen to a point that made it necessary to secure at least ten bushels per acre to clear anything over $150 on a three-hundred acre crop. But this profit was less than the wages a harvest hand could earn in the season of about a hundred days, for his wages were then from four to five dollars a day and "found," with work seven days a week. A good many farmers have made crops since 1900 at an actual loss or on a very small margin of profit, for the average yield of wheat for the Pampas as a whole is less than ten bushels an acre, although there are some districts that give more than fifty bushels to the acre in good years.

Then there was witnessed the curious spectacle of tens of thousands of farm laborers crossing the ocean from Mediterranean Europe after harvest in their own lands with sickle and the tramping out of the grain by the hoofs of farm animals, to work a third of a year later with the header and steam thresher in the grain fields of Southern South America. Although the climate was congenial, food was lavishly provided, and wages were from eight to twelve times as high as in the old countries, in the south of Europe, few of these men could be induced to remain on the Pampas to become citizens after the observations and experiences of one or two seasons. Many of them make the trip from the Mediterranean to the La Plata year after year, but having both heard of and seen the "trickery of the natives," they decline to step over the bounds of protection given by the official representatives of their own countries, and return to their native lands at the end of the harvest period.

The boom in stock and grain production quite naturally led to a boom in land values, so that by 1905 farm land in all parts of the Pampas was even dearer, proportionately, than land of the same class in our own Mississippi Valley stock and grain states. If prices had remained reasonable, and if small farms in desirable districts could have been bought, harvest hands and other immigrant farmers would undoubtedly have been tempted to purchase properties and become citizens of the Pampas countries, thus giving a further impetus to their agricultural development. But the good land is largely in possession of the aristocratic native families, and generally they will not sell off farms of a few hundred acres. The general policy is to rent tenants several hundred acres each for a few years, often three, four or five, for the growing of grain, with the proviso that at the end of the term the land is to be seeded to alfalfa. Government lands, usually undesirable on account of their low fertility or because of their difficulty of access, are being sold in small farms. Many of these are fit only for grazing and offer insufficient inducements to ambitious immigrants.

In this brief survey of South American agriculture, we see that the continent has an imperial domain of farm lands waiting to be developed; that the native aristocratic whites are not disposed to welcome immigrant farmers on favorable conditions; that the advance in Pampas stock and crop production between 1870 and 1905 was phenominal because of phenominal conditions which reached their climax in the latter named year; that since 1905 the increase in production

and export has shown only slight gains; and that there is no evidence that the farmers of South America will ever be likely to dominate European or American markets to the detriment of our own husbandmen.

The CHAIRMAN: Ladies and gentlemen, I know you will be delighted with a change of the program at this time, and I have the pleasure of saying to you that we will now be favored with a vocal solo by Mrs. Brennan, of this city.

The solo and an encore were then delightfully rendered.

The CHAIRMAN: Are there any announcements to be made before the closing of the meeting?

Let me call your attention to the program for to-morrow morning's session. Order will be called at 9.00 o'clock and Mr. H. M. Gooderham, of Patton, Pa., will preside. "Economical Milk Production," "The Protein Requirements of the Dairy Cow," and "Cow Testing Associations" are the subjects that are set for to-morrow forenoon. They are all interesting and will be handled by persons of experience and authority in the respective lines.

MR. CLARK: The Committee on Resolutions will meet in the room to my right at 8.30 to-morrow morning.

The CHAIRMAN: Are there any further announcements? Hearing nothing further, the Institute stands adjourned until 9.00 o'clock to-morrow morning.

Thursday Morning, June 26, 1910.

Mr. H. M. Gooderham in the Chair.

The CHAIRMAN: The meeting will please come to order. The first speaker for this morning is a man who comes to us with an introduction as the best authority that they have up in New York on the producing of milk, and we will therefore have this morning, on the subject of "Economical Milk Production," Prof. Edwin Van Alstyne, of New York.

PROF. VAN ALSTYNE: Mr. Chairman and Friends: I cannot say that I like your introduction for two reasons: First, you said I was the best authority in New York State. Now, I don't want to come under any such circumstance as that, because it is not so. In the next place, I was introduced as "professor." That may or may not mean much. Sometimes it is a title of respect and dignity when a man is at the head of some department in the college, and other times he might be an expert on the weight of a hog. I am not "professor." I am a farmer; that is my business, and I want to come to you to-day as a farmer and dairyman, a man of like fashion as yourself, and my subject, as your program says and announced, is "Economical Production of Milk."

Prof. Van Alstyne then delivered his address as follows:

THE COST OF MARKET MILK.

Three Ways in Which it May be Reduced by the Producer.

By EDWARD VAN ALSTYNE, *Kinderhook, New York.*

Mr. President, Ladies and Gentlemen: I think all of us agree that the margin of profit over the cost of production is exceedingly small. In fact in many cases the only real profit is the converting of unsalable or low priced raw material grown on the farm, such as pasture grasses, stalks, hay, etc., into milk. The milk costs in feed, labor and interest on the money invested in the cattle and plant, every cent that is received for it. The crops referred to, marketed through the milk, afford a substantial increase over the cost of production. While dairymen have been called—and with some degree of truth—manure, rather than milk makers, yet when one realizes that a dairy cow will yield eleven tons of solid and liquid excrement in twelve months, worth at current prices for the fertilizer contained in it $2 a ton, allowing that it is all saved, we have a value from the manure of $22, an item not to be despised, as evidenced by the productivity of the farm of the dairyman in comparison with that of his neighbor who is not a stock keeper. These two sources of profit will explain why, in view of the numerous records and cow census of unproductive dairies, few dairymen are sold out by the sheriff. Nevertheless, there should be, over and above these items, a substantial increase direct from the milk, a discussion of which is my chief purpose at this time; but I want first to take a broad view of the situation from the standpoint of the dairyman whose livelihood must come in a greater or less degree from his cows, and who is not satisfied to keep them solely as machines to turn raw material into a finished product, manure makers or for their society. I believe it is wise to look the situation squarely in the face and see what it actually costs to produce a quart of milk under normal conditions.

My own herd are grade Guernseys. The production last year was one thousand pounds a head below the normal, on account of the prolonged drouth, which cut down the yield in spite of supplementary feed. In addition we had three cows go to pieces during the year. The total yield of the three did not equal what one of them would have done when they were right. There were also five two-year-old heifers with their first calves. All these causes reduced the yield as above. Yet these are things that must always be reckoned with. I am giving facts, not a fancy sketch. Had the milk yield been greater the cost of production a quart would of course, been less. My milk tests five per cent. I consider I could produce ten thousand pounds of three per cent. milk as easily as I could six thousand pounds of five per cent. milk. The former would

not ordinarily bring as much and would not furnish the kind of cream my trade requires. We carried during the year twenty-five head of milkers. The account stands as follows:

Purchased grain,	$556 94
Twenty acres pasture,	320 00
Soiling crops,	100 00
One hundred tons of silage,	300 00
Twenty tons of hay,	200 00
Total for feed,	$1,476 94

A trifle more than $59 a head. To this must be added $125 as interest on twenty-five cows at $50 each at 10 per cent. and $365 for labor, making a grand total of $1,966.94. Taking the total yield of milk, 62,500 quarts—2,500 a cow—and dividing the total cost by that sum, we find the milk cost to be .0314 a quart. The feed purchased is just what I paid out in the twelve months. The twenty acres devoted to pasture were helped out by some supplemental feed, such as clover, oats and peas, corn and not less than two pounds of grain daily, besides some after feed on the meadows. I reckon that the pasture would have cut two tons of hay to the acre, or forty tons total. This quality of hay—mixed grasses—would have sold that year for $10 a ton. Taking off $2 a ton for harvesting and marketing leaves $8 net, or $320, which I could have obtained from the pasture land had I devoted it to hay. It seems to me this is the only way to figure pasture. Let it be understood that there is probably no better in the State; in a normal year it will yield fully two tons of cured hay to the acre. On account of the drouth I have this year thrown in some after feed from the meadows.

Most people take about four acres to pasture a cow. The soiling crops are the only ones where I have to do any guessing. To get at the silage is easy. Eight months' feeding, thirty-five pounds a day an animal, makes, approximately, one hundred tons for twenty-five head. On the basis of the price of hay that year I put silage at $3 a ton. This year it would have been $1 a ton higher. Many figure silage at the cost of production. It cost me much less than $3 a ton to produce and put it in the silo. If I had the land that grew the corn in ear corn or potatoes, with a like amount of labor I should have received at least $45 an acre. I know what hay the cows ate, and value it at what it would have sold for. The cost of gathering would be the same in either case. Or, in other words, these products which were fed to the cows, had they been sold—or their equivalent from the land—as they otherwise would have been, would have brought me in cash what I have charged them at. I have put the value of the cows at $50 each. I do not question that they would bring that under the hammer.

I get at the labor in this way: Allowing twenty minutes daily to milk a cow, 292 days in a year, at $1.25 a day, is $365, or one man's wages. This would scarcely be enough for feeding them and cleaning the stables, but much of the labor of feeding would be expended in putting the product fed into market. I will keep a man and team drawing out manure all the year, if some one will furnish it free. While these figures may seem high to some, I am sure they

are correct, and the items of interest and labor might well have been put higher. If it costs more than three cents a quart to produce milk, what about those who are only getting that or less?

It must be apparent that they are not getting for their milk according to the cost of producing it. Our sales in cash were $2,357.57. Deducting from this the $1,966.94 leaves only $395.57 real profit to be credited to the dairy. In addition we have the skim milk, not reckoned here at all, and worth not less than $10 a cow. Also our own milk and cream for family use, with which the cows are credited; but it does not appear in the receipts.

As I have intimated, the yield was not large; yet, all will agree, not much below the average of the rank and file of the dairies of the State producing a milk with a much lower fat content. Much of the profit came from my being able to obtain, through being my own manufacturer, a little better than the average price and from the skim milk left on the farm, but had I been obliged to live, buy shoes for the babies, educate them, pay doctor bills, etc., solely from the profit of those cows there would not have been much to reduce the mortgage.

The large producing dairies—of which there are many—would stand little higher in profit, because of a less price received and no by-product left on the farm.

If these statements stand as facts, then the profit is too small. What is the remedy? The response goes up, "A higher price for the milk?" And to this we all say "Amen," with reason and justice. But this is not the first remedy.

Ex-President Smith in a recent address gave the following figures, taken from the Station Herd Record for the years 1905 to 1908. I quote:

"In 1905 wheat bran cost us $17 a ton; gluten feed, $24; cottonseed meal, $28; cornmeal, $22; dried distillers' grains, $27, and oats, 36 cents a bushel.

"In 1906 wheat bran was $22.50 a ton; gluten feed, $28; cottonseed meal, $29; malt sprouts, $18; oats, 40 cents, and corn 56 cents a bushel.

"In 1907 wheat bran was $22 a ton; gluten feed, $29; cottonseed meal, $29.70; malt sprouts, $18.50; oats, 40 cents, and corn, 54 cents a bushel.

"In 1908 wheat bran was $23.50 a ton; gluten feed, $31; cottonseed meal, $33; oats, 50 cents, and corn, 75 cents a bushel."

From these figures it is apparent that in this brief period there has been an advance in the cost of feed of $7 a head, with a constant or equal yield and no advance in price. This $7 is taken from the dairyman's profit. No account here is made of the increased cost of labor and higher value of cows. Should we go back a decade we find these feeds very much lower. The writer has within a shorter period laid them in for much less than the figures given by Mr. Smith for 1905, and they are higher again this winter. Labor costs full $5 a month more, and cows have advanced one-third in value.

At the best, then, the increased price received—and it has been substantial—leaves the dairymen little if any better off financially than he was before. It is not my purpose to create a hue and cry for better prices, although from the foregoing it must be apparent that we need and must eventually have them. The sooner the con-

suming public realizes these facts the better for us, and I have cited them hoping that they may come to its notice, at least in some slight degree, and help to controvert the columns of matter, editorial and otherwise, that have lately appeared in the press of New York City howling about the Milk Trust and the opulent dairymen, who are waxing fat on the products accruing from the advance of one cent a quart to the consumer for his milk, one of the cheapest and most nourishing articles of food he is placing on his table; and that the dairyman, too, may stop and consider whether he is getting what he should from his cows. The trouble has been, and is now, that men are waiting for an advance in price to help them, rather than exercise themselves in doing what they can within themselves to decrease the cost of production. My observation has been that the man who folds his hands and sits on the fence and howls about existing conditions and fails to do the first work—such as he and he only can do—will howl until Gabriel blows his trumpet, for he will be in no condition to receive the benefits when they do come. When, under Nehemiah, the walls of Jerusalem were rebuilt by a weak people beset with foes, the task was accomplished by each man building over against his own house. I well remember twenty years ago, when milk would scarcely average $1 a hundredweight annually, dairymen were sending up a howl of no profit, and longing for the day of higher prices. Well, this winter the price is double, and the howl about his non-paying dairy, like the poor, is still with us, except from those whom the old man with the scythe has gathered in—let us hope to the land of milk—and money. At the same time, men made money from their cows then, as they do now.

What are the requisites? None that I know are new. I can but emphasize, for the most part, some very old truths.

THE BETTER COW.

Long has this been tried, and although substantial progress has been made, yet here is the greatest leak. Too many cows—like Pharaoh's lean kine—are eating up the yield of the profitable ones.

One reason why there is not a more substantial advance in the price of milk is that we are making just a little too much. The cut in price of five cents a hundredweight in the spring of 1909 by the Bordens, with labor so high and feed higher than the year before, was only possible because there was plenty of milk in sight. The elimination of the least profitable cows would reduce the quantity put on the market, and thus enhance the price on a basis which always works—that of supply and demand—and those left will produce a profit worth while. In the report of Mr. Smith referred to, his best producing cow made milk at a cost for food of .4817 a hundredweight; the poorest at a cost of 1.227 a hundredweight; .102 as against .261 fat a pound, .118 as against .224. In all the years the variation was as great. While there is a greater or less number of good cows in every dairy, they are continually going the way of all the earth. Where are those coming from to take their place? Right here I want to call attention to the scarcity of milch cows. When one stops to think of the increased amount of milk each year, which is diverted from manufacture in butter and cheese and sold as crude milk and considers that milk selling usually means

no more calves raised, we understand why this scarcity. With a milk train starting from the St. Lawrence and drawing milk from hauling distance on either side until it reaches the Mohawk, whence it goes through the valley of the Hudson to Greater New York, there is left in its wake an army of farmers who are annually in the market buying cows. Men who formerly raised their own stock and had a surplus to sell. This process is repeated all along the southern tier, as well as in the Catskill district and through New England, Pennsylvania and New Jersey, as I can personally testify. When one speaks to these men of the importance of raising calves of the right sort, as the only sure way to get these good cows, he is met with the objection, "We sell our milk, and consequently cannot raise our calves." I contend that the only sure way to get this good cow economically is to raise her, and to this end I would have you who are still selling the milk to the manufacturer and retaining the by-product think more than twice before you dispose of your entire product lured by the extra ten cents a hundredweight in cash. Further, I am also sure that it will pay the milk seller to raise his own stock, although he must needs feed them whole milk for the first four or five weeks. A calf worth raising is well worth this outlay. Incidentally, it means better stock, for a man will not hesitate to so feed a pure bred or high grade calf, which is bound to have a value from its youth up, when it is an open question if it will pay to grow an inferior one, even on skim milk. This emphasizes the value and importance of the mature pure bred bull. Lacking such parentage, ninety-nine out of every one hundred calves will not pay to raise to make milch cows under any circumstances. The time is when there is a good business in raising good milch cows to sell.

FEED.

As I see it, the next important factor in economical production is the feed. If the cows are allowed to become reduced in flesh at any time because of insufficient or innutritious feed they cannot possibly produce the full quantity they otherwise would be capable of doing. Too often during the summer the pasture is such that even with supplemental green foods—even though the milk flow is kept up—the cows lose flesh. I am satisfied that a small amount of grain in such cases will be in the line of economy, even though, as is usually the case, the increased milk scarcely pays for the feed. The cow will produce enough more when she freshens to more than compensate, and will require less food to keep her than if she must be built up as well as sustained. Again, when dry, during the last two months of pregnancy, too often the protein food is withheld that she needs to build her calf, consequently she freshens without filling her udder, is thin, and again fails in what she would be capable of doing had she some reserve to draw on.

We are spending too much of the proceeds of our milk for purchased grain. In the desire to produce a large quantity we are feeding for production rather than for profit.

If one will note the character of the feeds most in evidence through the dairy sections he cannot fail to observe that by far the largest part of them are the "mixed feeds," comparatively low in protein—

the thing that one most usually needs to buy—and high in fibre, of which he has a surplus at home. The straight by-products of the mills, breweries, malt houses, starch factories, cottonseed and linseed oil mills are neglected, because the price a ton is higher. Time forbids that I should particularize or go into a dissertation on feeding, but I am sure I have touched on one of the greatest sources of loss in milk producing. We have come to the time when we would better grow on the farm more of the feeds our cows require, insuring their purity and nutrition and production at first cost—silage, more clover and alfalfa, oats and peas and barley, both as fodder and grain, not forgetting that the early cut hay will take the place of a pound daily a head of grain. Were the number of cows reduced, as suggested above more and better feeds could then be produced on the farm to more nearly sustain those which remain.

SANITATION.

Last more attention to matters pertaining to sanitation make for economical milk production. On this point, particularly in the milk producing sections, there has been a strife between the producer and the receiver of milk. My brethren, these things ought not so to be. As is always the case, there is fault on both sides, and it is because of a desire to help adjust this most important matter that I disgress a bit from this, bearing on economical production. I think the handler has been most to blame, although with no bad intent on his part, but he has allowed—or been forced to allow—a set of men to go out to inspect the dairies furnishing him milk who have no practical knowledge of dairy matters, and whose main thought is to draw their pay and exercise a little brief authority. The farmer despises such a man, and cannot be blamed if inclined to connect them with the business end of a good dog. So long as the so-called inspection is done by men of this class no progress will be made, particularly when they insist on improvements that require a large cash outlay, and at the same time the receiver of milk cuts the price a half a cent a quart, as has been done.

The CHAIRMAN: We have a short time for inquiries. Are there any questions in reference to the paper?

MR. BAYARD: What will it cost, Mr. Van Alstyne, to raise a cow until she is a producer?

MR. VAN ALSTYNE: Not less than $35.00.

MR. BAYARD: To raise the cow from a calf?

MR. VAN ALSTYNE: To raise the calf up to the time she is a producer, about two years or a little better, not less than $35.00 and at present prices of feed rather more. That is figuring on cheaper land for the pasture than what I have given here. I could not do it on my own land.

MR. BAYARD: That cow at that time is worth about twice that.

MR. VAN ALSTYNE: Pretty near. She is worth, the two year old heifer that we have raised is worth more to me than the cow that nineten out of twenty times I can buy for $50.00.

MR. GEORGE: How long should the cow be allowed to go dry?

MR. VAN ALSTYNE: How long a cow should be allowed to go dry? I would sooner have them dry for two months than less. I used to think four to six weeks long enough; but if you look at it, the amount of milk they give the last couple weeks does not amount to much. The quantity is necessarily small, and it is a drain and if dry a little longer they have the chance to pick up. They will give enough more milk the next period than you would get during the last few weeks. I find with a good producing cow it is next door to impossible if she becomes thin to put any flesh on her back when milked. I do it. I got to do it, when dry. Another proposition, not very good, is to have them dry up for two months. I have some of that kind. We feed a little more and milk them.

MR. NORTHUP: At what time of the year is it best to have cows fresh in order to make most out of them?

MR. VAN ALSTYNE: I am satisfied that a cow fresh in November, other things being equal, will give 1,000 pounds more milk in the year than one fresh in the Spring because when she naturally tends to dry off she gets the grass and she gives pretty nearly as much milk as a cow fresh in February or April. And another proposition enters in there—the time when you need the milk most. I have got to have the cows come in late July and August because that is the time when school begins, the people come in from the cities and my cream trade increases and you have the last of the Summer ice cream trade. That is the time we have to have the cows come in and yet I consider this the poorest time in the year for profits from cows, because while milking well for the time they are contending with shortening pasture and with flies and later with the early frosts and the change between green and dry feed, and by Winter those cows won't do very much better than those that came in earlier in the season. This is from an economical standpoint; but on the other hand the necessity for the milk at that time plays an important part.

MR. NORTHUP: What is the best remedy for the terrible flies?

MR. VAN ALSTYNE: Plenty of feed in the Summer. That may seem not human. I have tried a variety of fly preparations. Some are good, some not. Most times I have found more flies come to the funeral than on the original. But if you keep them in the stables, a portion of the time where dark, have them out to the pastures in the cool of the day, and then give them plenty of feed in the Summer, that is the best thing I know.

MR. BARNES: In case a cow went dry, is there a remedy for that?

MR. VAN ALSTYNE: I never tried one. I shorten the feed and then if you do that you shorten the flow and sometimes you will have to give the cow something that physics. The derangement of the bowels will always reduce the milk flow. If you can do that with reason, and sometimes that can be done by some laxative feed that will start the bowels, and then reduce the feed for a day or two and then you can, at the time they naturally shrink, you can sometimes produce it; but it don't always work.

MR. KESTER: Has the first dry period anything to do with their after length of time? The second time she is pregnant has the length of time she is allowed to go dry that first time an influence on the succeeding periods?

MR. VAN ALSTYNE: I think very probably. Of course, there is something in the breed, but I think your question is a very pertinent one, that if the heifer with her first calf is allowed to have a short milking period the tendency for her next time to go dry will be about the same time, and how to counteract that. If the heifer freshes in the Spring—I like to have them twenty-four to twenty-six months old, then I hold that heifer over every season until she freshes next Fall and in that way I accomplish two things: I tend to establish a longer milking habit and I give her in that second year a longer period to recuperate.

I am satisfied of this from experience, that the value of the cow that we raise is determined very largely the first six months, that if that cow fails to get sufficient nourishment the first six months that no subsequent treatment at all will eradicate that. If she has a set-back later it will affect her but not seriously. The thing is to keep them in the pink of condition from the day born to the day they drop their first calf and then keep the calf too. The next year the cow is settled.

A Member: How do you feed them to keep from going dry?

MR. VAN ALSTYNE: Feed them good on concentrated feed, bone-making material, bran and protein feeds, alfalfa, any feed that will make flesh production and good bone and muscle. Be sure to feed bone-making material in the feed. I can't illustrate it better than by this: I was in the herd of Mrs. Strawbridge, the Guernsey breeder, near Philadelphia. I had just been in Mr. K.'s herd previously and I surely must say that the make-up, the dairy form of Mrs. Strawbridge's cattle were not as good as a rule as were Mr. K.'s, and yet her record surpassed it and I was wondering about it until I looked at the yearlings and two-year olds and I never saw Guernseys of that age that had those strong forms and that good a development. I said to Mrs. Strawbridge, "How do you get such big heifers?" And she said, "Why, we have plenty of skim milk and we feed these calves milk for over a year." I said, "There is the secret of your big production. You have got the heifers developed so that they are bound to do business when old enough." There was a development such as I never saw before or since.

MR. NORTHUP: Would you as soon have the dried brewers grain as the wheat bran?

MR. VAN ALSTYNE: Yes sir; at the present prices sooner. There is a proposition that confronted me last Winter. Wheat bran cost $27.00 a ton and the brewers grain $25.60 that had in it twenty-six per cent. of protein and seven per cent. fat, for less money and nearly twice the actual food value. At last year's prices you can feed a pound of digestible protein—the dried brewers grain is not as digestible--but you can feed in dried brewers grain a pound at seven cents where in wheat bran it would cost eleven cents.

A Member: I would like to hear something about Canada peas? How you raise and feed?

MR. VAN ALSTYNE: I am glad of that. They are not only for Winter feed. I sow two bushels of peas to one of oats. I would grow all peas if they would stand. I sow not exceeding two and one-half bushels of this mixture to the acre then you have just enough oats to hold them up. Sow early and put in deep as you can and you have a magnificent feed for Summer and Winter. The first crop of oats and peas I cut when the oats were in the milk, when the peas were formed. My stable was full of little peas and the cattle did not care much for it; but I learned afterwards, and that is important, the time to cut oats and peas is when the oat head is just formed, when the peas are just in blossom. Then you have all the nutriment in the stalks. You have not got that little imperfect green pea that is going to waste.

A Member: How deep do you plant?

MR. VAN ALSTYNE: The deeper the better and yet better is to sow them broadcast and plow in four inches and four or five days after sow the oats, drag them in. That costs time and so practically we don't often put them in that way. Sometimes we mix them in the drill and set as deep as we can so as to get them in as deep as possible and our peas will not set quite as long and the oats come faster. But it is dollars and cents we have to look after. Labor is high. We have to look at the final results. The ideal way is to get them in as deep as you can. I think the practical rule is to put them in together.

Another thing is to take a bushel of oats, half a bushel of barley and half a peck of Canada peas and sow together at the rate of two bushels per acre and let ripen for grain, and you get more grain than you will with either of the three alone. That small proportion of peas will stand up so that you can harvest the crop with the binder just as well as the oats alone and you will get a stand to ripen and balance the corn and the straw does not make bad fodder either.

MR. BAYARD: How much whole milk do you feed the calf?

MR. VAN ALSTYNE: I gauge it by the breed of the cow.

MR. BAYARD: How much do you feed the calf when starting?

MR. VAN ALSTYNE: One to two quarts, two or three times a day. This time of year, two. I would rather be on the safe side.

MR. BAYARD: How long do you keep up whole milk feed?

MR. VAN ALSTYNE: Just as long as I got it. I fed a bunch this Winter about eighteen months old. They had some milk all Winter.

MR. BAYARD: Whole milk?

MR. VAN ALSTYNE: That was skim milk.

MR. BAYARD: How much whole milk?

MR. VAN ALSTYNE: On the start I like to have the calf get the first milk of the mother and that is what nature intended. Let the calf stay with the mother and take the milk until the milk is fit to use and then we take it off and begin to feed one quart or not much more of the whole milk twice a day and then after the first week or ten days gradually begin to add a little warm skim milk, depending altogether on the season of the year and the calf. Keep increasing the skim milk and reducing the whole milk until the calf is three to four weeks old. Sometimes we continue the whole milk longer.

MR. BAYARD: I don't want anything of that kind, but I am bothered how you can raise your cows up to two years old at $1.50 a month, because we cannot do it here in Pennsylvania if you can do it in New York.

MR. VAN ALSTYNE: I say with the skim milk and the silage and the cheaper pasture. We could get pasture for the first season, we are offered it for $6.00 for the season, for the more than six months because they get out in May. I could not do that and pasture them on my own land. It costs nearer $50.00.

MR. NORTHUP: Does it make much difference whether the calf sucks its own mother or another mother?

MR. VAN ALSTYNE: Yes, decidedly different. That mother's milk is what nature designed for the calf. It has those properties in it which act on the bowels which the milk from another cow does not unless fresh at the same time and one fresh at another time would therefore not be as good. I used to fatten calves and I always had trouble with the calves that one dairyman brought me, trouble with the scours. I could not see why as I had no trouble with anybody else's. I said: "Henry, what do you do with your calves after they are born?" He said, "I take them off the cow and feed them out of the pail." I said, "If you let them nurse them as they come I think it will be better." And I had no more trouble with them after that.

A Member: Do you feed cotton seed meal?

MR. VAN ALSTYNE: Lots of it, but not to calves. It is the cheapest feed on the market. It has been the cheapest feed for the

last three years. With cotton seed meal at $1.60 per hundred, $32.00 a ton, a pound of digestible protein costs a trifle less than five cents.

A Member: How heavy do you feed when you feed heavy?

MR. VAN ALSTYNE: I wish you would not ask me on that. Ordinarily we feed two to three pounds a day, but I have fed as high as five.

The Member: With bad results?

MR. VAN ALSTYNE: Good and bad; that was the average of the dairy. I fed them in connection with silage, with the wet brewers grain, and they were grade Guernsey cows. That was the average for the dairy; some cows got more but I never had a bit of trouble.

A Member: You fed other grain with it?

MR. VAN ALSTYNE: Sure.

A Member: What other grain?

MR. VAN ALSTYNE: We used the wet brewers' grain. This Winter we fed from December on an average of five pounds of dried brewers grain to three pounds of cotton seed meal.

A Member: Do you prefer the brewers grain to oil meal?

MR. VAN ALSTYNE: They don't come in exactly the same class. The oil meal is very laxative and while I have silage and cottonseed meal I don't care for the oil meal because it costs more and is laxative. If I would feed dried blood then I would rather have oil meal than cottonseed. But you got to feed some bulk grain and the cottonseed on the dried brewers' grain is best.

A Member: Do you feed concentrates on the side?

MR. VAN ALSTYNE: I don't. We have two milkings and we don't want to feed the silage until after we milk. The first thing in the morning they get the grain and after done milking they get their silage, and the night is the same thing. Now honestly, I don't think it makes much difference if you feed the grain and silage together or whether you feed twice a day or three times a day, as long as you feed regularly.

A Member: Suppose you are feeding concentrates, would you rather feed the oil meal and cotton seed first or feed them on the silage. If I were not feeding any bulk feed at all I would feed the concentrates on the silage. We give the hay at noon.

MR. GOODERHAM: Do you feed the cotton seed shortly after fresh?

MR. VAN ALSTYNE: I don't like to feed the fat feed until the fever is all out of her. It is very heaty.

A Member: How about the gluten feed?

MR. VAN ALSTYNE: I like the gluten feed although it has not the body building that cottonseed has. I never had feed that gave as much milk but there is not much cow there unless you put a meat builder in with the gluten, formulate a bone material.

A Member: Do you prefer lots of corn in the silage?

MR. VAN ALSTYNE: Sixty bushels of ears to ten tons of stalk is as much as the average dairyman should have. If you have more you will feed at a loss. That is all you can economically feed in the silage. It would be better to have the corn. It does not pay to add corn meal to the silage. About sixty bushels would be equivalent to two pounds a day and more than that I would not like to have. We didn't put any in it and then we put in more and more so that it was yellow with the corn and the result was the corn laid in the gutters behind the cows. Some people have their hogs there. I would rather have the hogs eat at the first table. I found when I reduced the corn I got just as good results and didn't have the corn throwed away.

The CHAIRMAN: Any more questions?

A Member: You said you can make 10,000 pounds of three per cent. milk just as easy as you can 6,000 pounds of five per cent. You don't mean that you can change the quantity of butter fat by your feed?

MR. VAN ALSTYNE: No sir. I should have the Holstein cow if I wanted to get 10,000 pounds.

The CHAIRMAN: Any more questions? If not, I will make the announcement that immediately after this session, the photographer will be down at the front entrance of the Court House to take the pictures of the Institute Lecturers. You will kindly go down and lend your assistance to get in shape. This will include the visiting lecturers.

The next subject is "The Protein Requirements of the Dairy Cow," by Prof. Wells W. Cooke, of the United States Department of Agriculture. It is not necessary for me to say anything with regard to Prof. Cooke. We know him so well.

Prof. Cooke then presented his address as follows:

THE PROTEIN REQUIREMENTS OF THE DAIRY COW.

By PROF. WELLS W. COOKE, *Washington, D. C.*

Few problems of livestock husbandry have received more attention than this one of the question of how much protein is required by the dairy cow. In 1864, Wolff published his standard ration for the dairy cow which contained 160 pounds of total digestible material and 2.5 pounds of digestible protein. For many years this was accepted as the standard and has probably been used more than all other standards combined. The great corn producing states of the Union, when they turned their attention to dairying, found that under their conditions protein was the most expensive ingredient of the ration and many experiments were conducted for the purpose of ascertaining how much this daily allowance of protein could be reduced, without decreasing the milk flow, or diminishing the protein in the animal's body. Woll collated the ration of many of the best dairymen of the United States, and as a result of his investigation, he concluded that the dairy cow could do well on a ration containing 17.3 pounds total digestible of which only 2.15 is protein. This last standard—called the Wisconsin standard—has been advocated for the use of those who can raise starch cheaply, but would have to buy the protein if they fed it heavily. Both the above rations are faulty in that, they are supposed to be the proper rations for a medium sized cow giving a fair flow of milk, but they make no allowance for variations in size or milk flow. In 1897, Lehman published his standards for the dairy cow, in which he varied the ration according to the amount of milk produced. His ration for a cow giving twenty-two pounds of milk daily contains 16.7 pounds of total digestible of which 2.5 pounds are digestible protein, thus agreeing very closely with Wolff's published thirty years earlier.

The latest standard ration for the dairy cow is that proposed by Dr. Armsby of the Pennsylvania Agricultural Experiment Station. His ration is obtained in the following manner: It is known that a thousand pound farrow cow that is not producing milk will keep up the protein need of the body on a daily allowance of 0.5 pounds of protein. A pound of milk contains about 0.3 pounds of protein. Dr. Armsby believes that an addition to the maintenance ration of 0.05 pounds protein for each pound of milk produced will be amply sufficient for the needs of the cow. On this basis the standard ration for a cow giving twenty-two pounds of milk daily would contain 15.2 pounds of total digestible material of which only 1.6 pounds would be digestible protein. It is thus seen that the various standards differ widely—the two German standards being the highest in protein and Dr. Armsby's the lowest.

Several years ago I had occasion to study the rations fed by many dairymen in Vermont. I found that the dairy cows near the towns, whose milk was sold in town for use as whole milk, were of a better grade than the average, and were fed more protein than was called for even by the German standard. Three years ago in the best dairy

districts of New York State I found the same state of affairs. In each case the rations fed were the result of long years of careful feeding with reference to net profits. These dairymen had become convinced that the extra cost of the heavy feeding was more than counterbalanced by the increased yield of milk. On the other hand whenever I examined the rations fed on dairy farms that were remote from the railroad and where the milk was used for the production of butter or cheese I found a relatively small amount of protein in the daily ration and a much smaller average milk yield per cow per year. On such farms, the bringing in of grain or of by-products rich in protein was expensive, and experience had seemed to prove to these dairymen that their net profits were larger when they fed only such grain and coarse fodder as they could grow on the farm.

The above experiences offer strong presumptive evidence, that (leaving out of account the question of price) a ration rich in protein is better adapted for milk production, than one poorer in this element.

In most of the states east of the plains, protein is expensive, and in all my earlier feeding of dairy cows, the important question was, how little protein can a cow use and still do her best. Then I went to Colorado and fed dairy cows on the basis of $2.50 per ton for the best alfalfa hay, $9.00 per ton for wheat bran, and $22.00 a ton for corn. The protein problem was entirely reversed. Protein was about the cheapest food ingredient, and the question became, not how little must a cow have, but how much can she consume without injury. For a whole winter I fed ten cows on a ration consisting of four pounds of bran, four pounds of linseed meal and all the first class alfalfa hay they would eat. Each of these feeds is rich in protein and the total ration contained much more than the real needs of the cow. These cows were somewhat above the average in size and probably ate about twenty-five pounds of alfalfa hay per day per head. A ration of four pounds of bran, four pounds of linseed meal and twenty-five pounds of alfalfa hay would contain 4.6 pounds of protein as compared with the 2.5 pounds daily in the richest German ration. These cows averaged about twenty pounds of milk per day, which would take out 0.8 pounds of protein, leaving 3.8 pounds of protein for the use of the body of the cow as compared with the 1.7 pounds in the German standard and with the only 0.5 pounds of protein that seems to be required to renew the actual daily breaking down of the tissues of the body. It is evident that these cows received much more protein than they needed, yet this extra protein produced no bad effect, the cows kept in excellent health, they seemed to produce the milk more easily and held out in milk flow better than under the previous feeding with a ration richer in carbohydrates.

English steer feeders found out long ago that their animals made faster gains when they were fed an excess of protein and it is customary in England to feed steers nearly twice as much protein as they really need. The excess of burned up in the body and has the same use and food value as an equal weight of carbohydrates.

Taking it for granted then that a liberal amount of protein is advantageous to the dairy cow, the practical question is, can the dairyman at present prices of feed and products afford to furnish his cows an excess of protein. No single answer can be given

that will apply to all farms in Pennsylvania, but some facts will be presented that seem to indicate that many Pennsylvania dairymen would receive an increased profit by using more protein than is called for in the richest standard ration. During the last few years the prices of grains and mill products have increased enormously, but the increase has not been proportional to the protein content and at the present time the market price of a dairy food bears little or no relation to the per cent. of protein it contains. Corn and bran have been the standard grain feed of the dairyman. Let us see how these compare in their composition and price with some other dairy foods.

	Pounds digestible in 100 pounds.	Price per 100 pounds.	Cost per pound digestible, cents.	Per cent. of digestible protein.
Bran,	57	$1 25	2.10	11
Corn,	81	1 25	1.50	7
Oats,,	66	1 90	3.00	9
Gluten feed,	78	1 65	2.10	20
Ajax,	80	1 55	1.95	22
Linseed meal,	74	1 90	2.60	23
Cottonseed meal,	81	1 80	2.20	36

Evidently the foods rich in protein do not sell at a correspondingly higher price and a dollar invested in some of the oil meals for instance, will buy almost as many pounds of digestible material as it would spent for bran and will at the same time secure a much larger amount of digestible protein.

A grain ration of equal parts by weight of wheat bran and cornmeal is a first class feed for the dairy cow and has probably been used more than any other one grain mixture. Years ago when bran was cheap, this was an economical ration, but under the present high prices it is possible to make a cheap mixture. A ration of four pounds of bran and four pounds of corn meal would contain:

	Total digestible, pounds.	Digestible protein, pounds.	Cost.	Fertilizing value of the nitrogen.
Four pounds bran,	2.28	0.44	$0 05	$0.0195
Four pounds corn,	3.24	0.28	0 05	0.0125
Total,	5.52	0.72	$0 10	$0.0320

If the four pounds of corn are replaced by two pounds of gluten feed and two pounds of cottonseed meal, and if three pounds of Ajax are used in the place of three pounds of the bran, the ration will be considerably improved at only a slight difference in expense.

	Total digestible, pounds.	Digestible protein, pounds.	Cost.	Fertilizing value of the nitrogen.
Two pounds gluten feed,	1.56	0.40	$0.033	$0.0185
Two pounds cottonseed meal,	1.62	0.72	0.036	0.0337
Three pounds Ajax,	2.40	0.66	0.046	0.0352
One pound bran,	0.57	0.11	0.012	0.0049
Total,	6.15	1.89	$0.127	$0.0923

It will be noticed that the total food value, *i. e.,* the total digestible material is somewhat increased from 5.52 pounds to 6.15 pounds, and that there is not much difference in cost for each pound of digestible food. The first ration furnishes 5.52 pounds of digestible material for ten cents or 1.8 cents for each pound digestible. The second ration contains 6.15 pounds digestible at a total cost of 12.7 cents or 2.1 cents for each pound of digestible food. The most striking difference in the two rations is with reference to the amount of protein they contain. Here the figures are 0.72 pounds for the first ration as compared with 1.89 pounds in the second. In other words the amount of digestible protein in the ration has been much more than doubled, with only a slight increase in the cost of the whole ration and of course a large decrease in the cost of each pound of digestible protein.

It is evident from the figures given that the present market prices bear little or no relation to the amount of protein contained in the feed and the obvious lesson is that in buying feeds for the dairy cow those should be selected that furnish the largest amount of protein at a reasonable price.

The fertilizer side of heavy protein feeding should not be ignored. During the last few years the market price of nitrogen has risen until now in mixed goods it costs not less than twenty-five cents a pound and probably in most cases it exceeds thirty cents.

The richer the food in protein, the richer the manure in nitrogen, and it is much cheaper to buy nitrogen in feed and apply it to the fields through stable manure, than to buy it in the form of commercial fertilizer.

	Pounds of nitrogen per ton.	Value of nitrogen per ton at 25 cents per pound.
Bran,	39	$9 75
Corn,	25	6 25
Oats,	29	7 25
Gluten feed,	74	18 50
Ajax,	94	23 50
Linseed meal,	106	26 50
Cottonseed meal,	135	33 75

The fertilizing value of cottonseed meal is equal to its market price and although the dairyman cannot expect to recover in the manure all of the nitrogen of the feed, he ought to save four-fifths of it. Under present prices and conditions it is much better for the dairyman to spend his fertilizer money for the cheaper phosphoric acid and potash and obtain the needed nitrogen by the purchase of concentrated feeds.

Most writers and speakers say that the full standard ration for the dairy cow should be fed when she is in full flow of milk and that later on as the milk flow decreases the amount of grain should be correspondingly lessened. My practice has been different. I have fed a maximum of grain to the cows fresh in milk and have reduced this only in slight amount until the cows became dry. During the latter part of the milking period the food of the cow must supply the ingredients for the milk produced and must also furnish everything necessary for the growth of the calf. No exact statement can be made as to how much extra protein the cow must consume for the needs of the calf, but it is probably not far out of the way to say that the growth of the calf to the time of its birth requires as much food as would be needed for the production of an extra thousand pounds of milk. But I believe in heavy grain feeding to the cow in the latter part of the lactation period, for still another reason. It seems to have been pretty definitely settled that a cow gives more milk and makes more butter in a year, the fatter she is at the time of calving. Now that milk-fever has ceased to be a menace, no dairyman can afford to have his cows in poor flesh at calving-time.

Summary—Use such highly nitrogenous grains in the dairy ration, that the cow is always receiving an excess of digestible protein. Continue this heavy protein feeding throughout the milking period.

A Member: What becomes of the excess protein that is wasted?

PROF. COOKE: When cows are fed excessive protein every part of that excess goes into the manure. There is absolutely no waste of protein in the cow's system.

A Member: What is the increased fertilizing value over the cost of the protein feed?

PROF. COOKE: That is something to keep in mind, especially during the last years when the price of feed has risen so enormously. At the present time the cost of nitrogen is not less than twenty-five cents. I don't believe many of you could get it short of thirty cents.

A Member: Professor, isn't that an excessive price to pay twenty-five cents?

PROF. COOKE: In mixed feeds we cannot buy it for less. We can buy it at eighteen cents in pure chemicals. I think the farmer should spend his fertilizer money for phosphoric acid and potash and get his nitrogen in some other way.

A Member: Professor, isn't it true that some of the nitrogen that we get on the farm in some crops is not available at a temperature of 50 degrees whereas nitrate of soda is.

PROF. COOKE: Yes, but nitrate of soda is a little risky for the ordinary farmer.

A Member: Professor, when you feed the cow the excess of protein and she uses all she requires for the production of milk, does she lay a part of the protein on the body in meat?

PROF. COOKE: That depends on the cow. If a dairy cow you cannot make her when giving milk; as she decreases in milk, the latter part of the milking period I believe a dairy cow will tend to put on some.

A Member: If you have an excess of carbo-hydrates and have diminished the protein, what does she do with the excess of carbo-hydrates?

PROF. COOKE: She has to burn it up. She cannot lay that on.

A Member: Explain to me how that comes, that you feed a cow giving a moderate flow of milk an excess of protein with the carbo-hydrates that she burns up, what becomes of the excess protein?

PROF. COOKE: Well, the protein is the part of the feed that the cow must use to put on flesh.

A Member: That is the point. You are giving me the idea that she could not use the surplus protein.

PROF. COOKE: I said in the first class milk cow. After the milking operation was done she would probably use it.

A Member: Suppose she is a first class dairy cow and eats as much protein as that, she will improve in flesh, that is a fact?

PROF. COOKE: Well, I have had cows in which that would not be true. Just so long as giving milk you absolutely could not put flesh on the bones. You could count the ribs across the pastern. That is what I meant.

A Member: Our experience is that you can by an excessive amount of protein and that is why I kept on that side. That you can build her up in meat; not show much in evidence; she may be like a race horse.

PROF. COOKE: That may be true.

The CHAIRMAN: Any other questions? If not, we will take up the next topic.

MR. CLARK: What will be a suitable time for the Committee on Resolutions to present its Report?

MR. MARTIN: Immediately on convening this afternoon.

The CHAIRMAN: The next topic is "Cow Testing Associations," by Mr. Helmer Rabild, of the U. S. Department of Agriculture.

Mr. Rabild then delivered the following address:

COW TESTING ASSOCIATIONS.

By HELMER RABILD, *Washington, D. C.*

The subject of cow testing associations is one which is very dear to my heart, because I have seen them in operation, and know what great things they have accomplished for dairymen in the old world.

As many of you know, it was not my good fortune to be born under the Stars and Stripes. I was born and raised in Denmark, that little two-by-four country across the Atlantic Ocean, which has an area of 15,000 square miles, and a population of two and a half millions of people.

I should like to go back in the history of Denmark a few years, in order to show the tremendous lot of good the cow testing associations have accomplished for its farmers and if I should say anything about the dairymen of that country which you might construe as a boast, I would ask you not to take it so, because no one can be more loyal to the country of his adoption than I am to this country. I speak of Denmark and the progress they have made because I am intimately familiar with it, have contributed my little mite towards it, and because I believe we can find in the history of this progress something from which we can draw a lesson.

In 1848-49 and 50, Denmark was involved in a war. Although this war was declared a victory for the Danish weapon, it drew very heavily on the resources of the country. A large number of its best men lost their lives in the struggle, and the expenses of the war were yet to be paid. The nation was slowly recuperating from the effects of the war, when in 1864 it was forced into a new war. This war it lost, and with it the dearest possession Denmark ever had, Schleswig-Holstein. The expenses of carrying on the war were still unpaid, and the national debt, to use an expression often heard in those days "extended up over the chimney tops." This enormous debt had to be paid by taxation of the resources of the country. The resources of Denmark were very limited, there were no forests, no mines, no industries, and no shipping, and the only resource which could be taxed was the soil; in other words, the farmers had to foot the bill. The country was on the verge of bankruptcy. The rate of interest was in 1872 three and one-half per cent. higher than it was on the English burse. The taxes went sky-high, and the system of agriculture carried on on the farm was not good enough so that it could create funds enough to meet these taxes. The Danish farmer had for many years been engaged in the beef business, and shipped his beef to the English market; but just about at this time the English farmer made up his mind that he might as well produce his own beef and keep that money in his own country, and so he asked Parliament to restrict the importation of Danish beef. This was done through Quarantine regulations, and the Danish farmer lost his last resource, the beef business. Many of them despaired of ever making enough money to meet the demands of the heavy taxation on their high priced land, and a large number left their farms and homes to be sold at sheriff sale to come to this country and try to make a new home for themselves and their families. Some, however, for reasons sentimental or otherwise, did not want to leave the country of their birth; they would rather starve there than live in plenty anywhere else, and these were the ones who have made Denmark the dairy country it is to-day.

The cows that were on the farms in Denmark at that time were principally beef cows. The average production of butter per cow in 1884, just twenty-five years ago, was only 112 pounds of butter per cow in a year. The Danish farmer soon realized that if he wanted to make any profit in dairying which, at that time, gave promise of staple markets for butter at fair prices, it was necessary that he should develop a better producing strain of cows, and he started in to select from his native cows, the individuals which showed that they possessed dairy quality, bred them to good sires, and raised their female progeny, and in this way he has succeeded in raising the average production per cow until in 1908 was 224 pounds of butter per cow a year. He has virtually changed the beef breed into a dairy breed by selection and good breeding. Along with this came a great improvement in the prosperity of the country, which in 1872 was on the verge of bankruptcy, and to-day it stands as second richest nation of the world in per capita wealth.

Now, ladies and gentlemen, that is what cow testing associations and dairying have accomplished for the Danish farmer, and it explains why I am enthusiastic about these associations. The average production of butter per cow in this country to-day is, accord-

ing to the United States census of 1900, only 142 pounds of butter per cow in a year. If we figure that this butter sells for twenty-five cents per pound, it means that the average cow brings in $35.50 in a year. Now, if it does not cost more than this amount for feed, the dairymen can just come out even; and if we figure that the skim milk, the calf, and the manure will offset the cost in taking care of the cow, the farmer has simply sold his feed to that cow at the market price, and has not made any profit on his dairy operations.

I do not see any reason why we should not be able to double this production, as the Danish dairymen have done, for we have a better climate, better feed, better cows to start with and just as good men. But if we do, I think we must follow the same lines, and perhaps adopt the same system that the Danish farmers did.

That is the reason why the Dairy Division of the Department of Agriculture has interested itself in the organization of cow testing associations, and have experimented with them in this country until we have learned that with some modification they can be successfully operated under our conditions.

We have in this country to-day fifty-two cow testing associations, and there is promise of a good many more. A cow testing association, to be brief, is simply an organization of twenty-six farmers which club together for the purpose of improving the profits from their dairy operations, through selection of the individuals in herds which show special dairy tendencies. Such an association employs one man who goes from place to place once a month among the members. He makes a visit to each place once a month, and obtains data from which he can judge the individuality of each cow in the herd. He remains twenty-four hours on each farm, and while he is there he takes part in the feeding, and weighs the feed each cow consumes. He also weighs the amount of milk each cow produces and he tests the richness of this milk with a Babcock tester. He does this night and morning at regular intervals twelve times during a year. And in this way he learns how much milk and butter fat each cow produces in a year, how much feed she consumes, and how much it costs to keep her. The farmer is furnished a complete record of each individual in his herd, and with this as a basis is enabled intelligently to select those for breeding purposes, which show the highest development of dairying tendencies. And first of all he learns which ones of his cows do not produce enough milk and butter fat to pay for the feed they consume. He learns to know his "star boarders." You know a "star boarder" is one who never misses a meal, and never pays a cent, and we have entirely too many of that class of "star boarders" in our herds. If we had not, the average production would be a great deal higher than it is to-day.

I have on this chart ten years record of one herd, and it shows what can be accomplished through membership in a cow testing association.

Herd B, Owned by Aug. Kinch, Beltaberga, Sweden.

Year.	Average number of cows.	Average feed units per cow.	Pounds milk per cow.	Average test.	Pounds butter per cow.	100 Feed Units Gave.		Food cost of one pound butter.
						Pounds milk.	Pounds butter.	
First,	70	2,421	7,320	3.05	245	302	10.1	19.8
Second,	28	2,695	7,905	3.13	272	293	10.1	19.8
Third,	46	2,566	9,003	3.20	317	350	12.3	16.2
Fourth,	55	2,507	9,984	3.18	350	398	13.9	14.3
Fifth,	61	2,587	10,584	3.22	376	407	14.5	13.8
Sixth,	64	2,743	11,236	3.22	399	409	14.5	13.7
Seventh,	71	3,035	11,333	3.21	401	372	13.2	15.1
Eighth,	79	3,111	11,486	3.18	403	369	13.0	15.4
Ninth,	77	3,075	11,023	3.17	385	358	12.5	16.0
Tenth,	79	3,051	11,399	3.34	421	374	13.8	14.5
Increase,	------	630	4,079	.29	176	72	3.7	-5.3

You will notice that Mr. Kinch had seventy cows to begin with, when he joined the association. After being a member one year, he learned that only twenty-eight of them were good enough so as to be used for breeding purposes, and so he promptly sold off the balance of the herd. He bred these twenty-eight cows to sires whose dams and granddams showed superior dairy qualities, and raised their heifer calves. He had some heifer calves from those twenty-eight cows on hand which were added to the herd so that in the third year he had forty-six cows. This number kept increasing until in the seventh year he had one more cow than he started with. In the tenth year he had seventy-nine cows, and the average production of the herd had been increased 4,079 pounds of milk per cow. The increase in butter per cow was 176 pounds. It took 630 more feed units per cow to produce this increased amount, but giving the feed units a value of two cents per unit, and the butter a value of thirty cents per pound, he had increased the profit per cow from seventy cows from $25.08 to $65.28. This means that in the tenth year he received $2,814 more from the same number of cows than he did when he started as a member of the cow testing association.

Assuming that he could apply the income from his herd to pay off a mortgage on the farm, with a herd like the one he owned the first year he could pay off a $20,000 mortgage in seventeen years; while, with a herd like the one he had the tenth year, this mortgage could be paid off in five and one-fourth years.

So, you see the value of that part of his life which he puts into the dairy business has been material increased.

I see no reason why an American Dairyman should not be able to do equally as well. It seems to me that it is only a matter of getting started.

On this second chart we find the average of the Lundatrakten's Cow Testing Association for ten years.

Lundatrakten's Cow-Testing Association, Sweden.

Year.	Average number feed units per cow.	Average number pounds milk per cow.	Average test.	Average number pounds butter per cow.	100 Feed Units Gave.	
					Pounds milk.	Pounds butter.
First,	2,586	6,890	3.11	326	266	9.1
Second,	2,458	6,582	3.11	225	268	9.1
Third,	2,501	7,357	3.16	256	294	10.2
Fourth,	2,418	7,692	3.17	268	319	11.1
Fifth,	2,281	7,653	3.04	256	336	11.2
Sixth,	2,443	8,268	3.04	277	338	11.3
Seventh,	2,603	9,155	3.05	307	352	11.8
Eighth,	2,648	9,338	3.15	324	353	12.3
Ninth,	2,585	9,183	3.15	319	355	12.3
Tenth,	2,751	10,064	3.12	345	366	12.6
Increase,	165	3,174	.01	109	100	3.5

There were 639 cows in this association, and figuring the feed units at the cost price of two cents per unit and the butter at its selling value of thirty cents per pound, 639 cows in the tenth year returned $18,240 more than they did during the first year they were in the cow testing association. There has been a continual increase in the amount of production, as well as in the economy of production.

Knowing these splendid increases which the cow testing work has accomplished, you will understand why I am enthusiastic about it.

In stimulating the interest in the work, the Dairy Division is co-operating with State authorities. In this State Prof. Van Norman is much interested in the work, and through his efforts two cow testing associations have been organized in the State; one at State College, and one at Chadd's Ford.

The Dairy Division, as I said before, is very much interested in this work, because of the results which have followed it in places where it has been tried. It stimulates interest in better dairying; not only in the development of better cows, but in better feeding, better housing and better care of the animals, better care of the product, it fosters community spirit, because it is co-operative, and it stimulates interest in the work on the farm, and that is what is needed most of all in a great many cases.

I have gone over this rather hurriedly, because the time is short, but if you know of any communities where there are twenty-six men who would be willing to pay $1.00 per cow per year toward defraying the expenses connected with this work, and let it be said in passing that this dollar goes to paying the salary of the man, the Dairy Division shall be glad to assist you through Prof. Van Norman in getting an association organized. We will also, as far

as our facilities permit, assist the association by furnishing books and blanks for the record work until such time as the State may make an appropriation for providing this material.

A Member: Why is it that the average test did not seem to increase in butter fat?

MR. RABILD: Because they probably did not pay an attention to the fat. In Denmark they pay more attention to the richness of the milk than in Sweden.

The CHAIRMAN: If there is nothing more the Institute will stand adjourned until 1.30 this afternoon.

Thursday Afternoon, May 26, 1910.

Dr. M. E. Conard in the Chair.

The CHAIRMAN: The meeting will please come to order. The first order of business, according to the arrangement this morning, is the report of the Committee on Resolutions. Is the Chairman of that Committee ready to report?

MR. CLARK: Mr. Chairman, I am going to make this suggestion; to expedite time: Let us adopt each resolution as it is read if there is no objection.

The Chairman of the Committee on Resolutions, Mr. Clark, then read the resolutions seriatum and they were so adopted as read, on motions duly made and carried. The resolutions were then adopted as a whole, on motion duly made and carried.

The report of the Committee on Resolutions is as follows:

REPORT OF THE COMMITTEE ON RESOLUTIONS.

MEMORIAL.

One year has passed since we met in the city of York. And soon this meeting will close and we shall return to our homes. But first, let us look back over the year and note the many blessings showered upon us. How thankful we should be to the Great Giver of these good things.

Again we realize death has come into some of our homes. Brothers R. F. Schwarz, Dr. I. A. Thayer, and the wife of Bro. Eschbach have been taken from amongst us.

Resolved, That in the loss of these Brothers and Sister we deeply regret, but the Lord's will is always right, and we bow in humble submission.

Resolved, These Brothers will surely be missed, yet the many kind words spoken by them in behalf of our calling will ever live though they are gone.

Resolved, That we extend our sympathy to the bereaved families and pray the Lord will ever remember them in this sore affliction.

Resolved, That the Farmers' Institutes do show appreciation of the courtesies shown by the Judge of your courts; the County Commissioners for the use of the Court House; to the Chairman of the Farmers' Institute in this county; to the Butler Plate Glass Company for granting the privilege to our members of visiting their glass plant; to all those who furnished the music, and all others who contributed to make the Institute a success.

Resolved, That we thank the hotel people for making our stay with them so home like, so much so that we feel sorry to leave them, and we can only bid adieu with the hope it may be our pleasure to come again.

Be it Resolved, That we earnestly urge the Pennsylvania Railroad Company to institute railroad facilities, making it possible for residents of Pennsylvania to reach Pennsylvania State College by rail, believing that the knowledge disseminated from this institution by more easy access, will be of mutual benefit.

Appreciating the very valuable and effective work accomplished by the Director of Farmers' Institutes in the advancement of agriculture and agricultural education, therefore

Be it Resolved, That all the County Institute Managers and Lecturers of Pennsylvania, do hereby unanimously and earnestly recommend and urge that the next Legislature increase the appropriation for this great work from $45,000.00 to $50,000.00 to be used in further advancing the most approved methods of agricultural pursuits.

Be it Resolved, That we the Farmers' Institute Managers and Lecturers of Pennsylvania, in convention assembled at Butler, Pa., are unalterably opposed to any reduction or abatement of the tax now imposed on the manufacture or sale of colored oleomargarine.

The great political parties of the State will meet in convention during the month of June to place in nomination candidates for Governor to be elected this fall, and realizing the vital importance of this election to our great interests, therefore,

Be it Resolved, That in convention at Butler, Pa., as "Institute Managers and Lecturers," do reiterate a resolution as passed at our annual meeting held at York one year ago, namely: "That we as representatives of the great industrial and educational forces of the Commonwealth and for the greatest good to the greatest number, do hereby pledge ourselves, and ask all good citizens to join with us in using every honorable effort to place the name of Hon. A. L. Martin on the ticket in the next gubernatorial contest, and elect him Governor of our great Commonwealth.

In the matter of Legislation we have been slow to see that we have but a small representation in the law making powers at Harrisburg;

Therefore, let us urge all parties to elect men who are identified with our calling so that we can get our share of legislation and not be so discriminated against.

M. N. CLARK,
W. E. PERHAM,
SYLVESTER SHAFFER,
A. J. KAHLER,
DR. M. E. CONARD,
A. W. CRAWFORD,
L. W. LIGHTY,
Committee.

SECRETARY MARTIN: Mr. Chairman, I regret that I have not the language to express in words fitting the high appreciation of the last resolution especially offered, betokening the spirit of confidence in a very weak vessel to fill a very important office. This vote of confidence will remain with me while I last as the utterance of men engaged so actively in the uplift of agriculture and will be a remembrance more pleasant many fold than the honors of the office for which proposed. I thank you.

The CHAIRMAN: Is there anything else to come up at this time?

MR. McGOWAN: I received a letter from Matthew Rodgers which I think it is proper to bring before this convention, saying that he is unable to be here with us, having to go to Philadelphia to attend the General Assembly of the Presbyterian Church, and sending kind remembrances to all the members of the Board and Institute force.

MR. CLARK: Mr. Chairman, perhaps one thing I omitted. We had another resolution pertaining to some effort to secure money in behalf of the Pennsylvania State College but the committee, after looking over the matter, thought it was better to refer this to the meeting of the State Board of Agriculture at its Annual Session in January next. That is the way we disposed of that resolution.

SECRETARY MARTIN: In addition to the letter that Mr. McGowan has presented and the other letters from various delegates to this convention, I have received a letter from Mr. William H. Stout, with whom you are all well acquainted, stating that on account of not very permanent sickness, slight sickness, he was prevented from making the long journey across the Allegheny Mountains to be with us. He sends his kindest regards to all in this letter.

The CHAIRMAN: Mr. Rodgers and Mr. Stout are two members that have been attending meetings very regularly and their faces are missed but we are glad to know that they are likely to continue with us. Is there anything else to come up now?

The first thing on the program for this afternoon is an address on "The Requisites of a Good Institute Worker," by Prof. Edwin Van Alstyne, of Kinderhook, N. Y.

Prof. Van Alstyne then presented his paper as follows:

THE REQUISITES OF A GOOD INSTITUTE LECTURER.

By PROF. EDWIN VAN ALSTYNE, *Kinderhook, N. Y.*

I trust that none of you will think it presumptious, for the stranger within your gate, to have selected the above topic. Should you consider me as one, "sitting in the seat of the scornful," or like the colored brother, who at a funeral of one of his race, pushed aside the wailing mourners and said, "If you wish to see grief, let me come," I should repent in sack cloth and ashes at having even thought of presenting the suggestion that follows: For while your innate courtesy would prevent any audible comments coming to my ears, I am sure I could read in your faces the comment, "What does this babbler say?" or, "Physician, heal thyself." Rather consider me as one among you who serveth.

The subject matter of this paper I have been incubating on for about a year, to deliver at the request of Commissioner Pearson, before my fellow-workers in New York. Not because "I have by any means attained, or am already perfect," but that a training under such men as J. S. Woodward, Prof. I. P. Roberts, Col. F. D. Curtis, G. T. Powell, and an experience and association of over twenty years, with some of the best men in my own State, as well as those whom we are all delighted to honor, for their work's sake, from the broad field of our own country, and our Canadian cousins across the border, and not least among the number some of your own Pennsylvania men with whom I have worked both at home and abroad and to all of whom I am debtor, has given me opportunities to mark the strong points as well as observe and depreciate the weak ones. To the end that I might speak a word, that would help some of the younger men, that they in their day—which is right upon them, for we of the old guard, in less than a decade will have put off the harness—may do better work than we ever did. For the Institutes of the future, with a trained class of hearers will demand a class of instructors far beyond those who have gone before. We have laid the foundation but it is for you to rear the superstructure. I was speaking to our ex-Director Smith at one time about the men whom we had tried and apparently found wanting, and I said, "Perhaps we have been too critical. Think what we were when we started." He replied, "You forget, Van, that the people took from us twenty years ago,—because they knew no better,—what they will not tolerate to-day." Surely he was right, for I would indeed pity the audience as well as the speaker, who had to submit to what we were able to give in those formative days.

Therefore, anything that I may say which may seem critical, is very likely a criticism that I have sometime had laid at my own door. All is spoken in the spirit of brotherly kindness, if you will so receive it and if on my return, or in the years to come, I can feel that any word spoken here to day, has helped any one of you to do more efficient work, and to have higher standards, and keener conceptions of your practice and opportunities, I shall feel well repaid. For nothing am I more grateful than for the words spoken

in season by some of those early associates, to whom I have referred. In the quiet of our rooms, after the day was done, calling attention to a loose or incorrect statement, a faulty or weak presentation, an unfortunate illustration or story, or some mannerism, that persisted in, would have been fixed. Of course some of them hurt at the time—for like all young men, I naturally thought I was a Bonargares, but what measure of success that has come to me I attribute largely, to the pruning knife, which they so nicely and so kindly used, and the high standard they set up. For they were giants in those days and their high standards I have never seen surpassed.

With all this in mind I had the boldness to give Director Martin the above, as one of the subjects upon which I might talk. Yet I was after all appalled, when I saw that he had selected it. He having so selected, and being with you in the flesh, I shall therefore give you my message, in faith—that it may be received with kindness,—in hope that it may be of profit,—in charity that thinks no evil,—and with fidelity to what I feel within me to be the truth.

THE MAN.

There are many things required of a good institute instructor; but first and above all must be *the man.* He may be, should be, many things, but all else will be as sounding brass and tinkling cymbals, except he is a success at home. By success I do not mean, he must have attained a competency. For many a man has made money, who is far from a success, but that he must be actually doing the things of which he speaks and doing them in such a way that he can speak to his own neighbors with the same force with which he speaks to strangers. This I make the first requisite of any man or woman that comes into my corps. When a conductor can introduce a speaker with a guarantee that he knows that he is doing that of which he speaks he has done much to insure the man a respectful hearing. Last winter I brought a new man into my force. He is a comparatively poor man: but because he has one of the best cared for young orchards in New York, an object lesson to the neighborhood, and has made a success with poultry, vegetables and small fruits, I was not opposed to trying him out, knowing that if he failed to make good as an instructor he would command respect for what he was doing; for no man can get very far away from his reputation at home. I have known some of the ablest men on the platform, who were favorites with their audiences, for the time being, whose farming was a by-word and a hissing to their neighbors. And "their works do follow them," for at a later visit no one had any faith in even the good true things he said; more than that, it marred the effect and effort of any other man in that place, perhaps for years to come. A case in point: Not long ago I followed a man who is exceedingly bright, well educated and I am told an excellent instructor. I knew that he had had little practical experience on the farm, and what he had, was not much to his credit. He was on this account eliminated from the force. The place had an excellent reputation as a good institute town. There were some local conditions which had rather reduced the attendance: but not enough, it seemed to me, to account for the falling off from the record of the previous year, and the lack of keen interest which makes a first

class institute. I had with me a most excellent force, each one of whom I could swear by as doers, and each well suited to the needs of that community. After the meeting was over, a gentleman said to one of us, "You gave us different doctrine from the man we had a year ago." After some questioning I found what had been said, and then drew out the comment, "We inquired about him and found he had made a failure of school teaching, farming, and everything he had undertaken, and then went to work for the State." I asked, "Did that have anything to do with the reduced attendance and interest?" He replied, "Yes, I am sorry to say it did." Comment is unnecessary. I would not for the moment imply that any man who is a success in the thing of which he speaks is a good institute man. Far from it.

ABILITY TO TEACH.

A man must be apt to teach, but I insist he must first be a success. We have, as have you, scores of good men, patterns in their communities. Some of them are not able or willing to go from home, so no matter what their ability they are not to be reckoned with. Others are able, some are willing, and some are anxious to go, but they lack the training, or the ability to so express themselves, as to be of any benefit to their hearers.

I have known many such, and they call forth my deepest sympathy and regret. With such I would bear long in the hope that they might, by environment and association improve; but an experienced man can, I think, very quickly tell whether such a man has the power in himself to make him a good teacher. One case will illustrate this: There is a young man in my state whose work in a certain line of farm improvement and crop growing, I have watched for several years at long range. He is an eminent success. Because of this he was asked to do some lecturing; in fact he did practically a whole winter's work. Needing some one in his particular line, and knowing he had the first requisite and feeling the experience he had would warrant it, in an unguarded moment I engaged him for three months. Later I was told that he was not a success as a teacher, but feeling that I could help so worthy a man, who had in him so much good sense, by timely counsel, I started in with high hopes. At the start I saw he lacked preparation, and I suggested an outline, which suggestion he gladly received, but alas, the longer I had him the worse he got. He wandered from Dan to Bersheeba and when he had occupied more than his allotted time had often not touched upon the very things the people wanted. I never had a man get on my nerves so before. The truth was that he could do, and did do, well the things that he had undertaken on the farm, but his mental processes were too slow ever to be a teacher. I was ready to sing the Doxology, when business matters compelled him to retire from the force. The pity of it was that he was a likable fellow and so far as he knew, he tried hard. It is the audience I am always thinking of. With another man, an eminent success in his line, but so slow and sleepy that after we had him out a week, I had a note sent up from the floor reading, "For heaven's sake stop that insect and save the audience."

Ability to teach is to a great degree a gift, but there are those things which will materially assist if one will heed them. Of these I will speak later on.

A GOOD MORAL CHARACTER.

Though a man may have the two requisites mentioned, yet he falls far short of the full stature of a good institute instructor if he is not a man of good morals.

Right here I want to stop and bear testimony to the fact, that with very few exceptions, the institute men with whom I have worked—and they are many—have been Christian gentlemen. The purpose of the institute is to teach agriculture, not to discuss politics, finance or religion. But the institute that has not left a little higher standard of morals and ethics in a community has not done all it ought, and might. After all the main thing back of a man's teaching, is what he *is*. Too often in rural communities the moral standards are none too high, as evidenced by the lewdness and profanity which abounds in ordinary conversation. Often an evidence of a deficient vocabulary and a lack of knowledge—that does not indicate a high type of manliness. Or the patronage received by local saloons, or—by courtesy—hotels. I do not mean to say that this is confined to farmers. It is considered part of the stock in trade of a local minister to advise against these things, but when there come into their midst, farmers whose hands are calloused, and who are familiar with farm work, which mark them as men of like passions with themselves, with good red blood in their veins who abstain from such things; and as opportunity offers—without ostentation—take a stand for rightiousness, and are not ashamed to pay tribute, and own allegiance to the church, they leave an impress not soon forgotten. All of which dignifies agriculture. Unless the farmer can be made a better—broader man, it will, in the last analysis, avail little, simply to make him a better farmer. The institute instructor who between sessions, practices at the bar, or listens to, or worse still, tells obscene stories, or who, by his conduct in any way, does that which is contrary to good morals, may provoke the laugh, and think himself a good fellow, but be sure he will lose cast, even with those addicted to such practices. Of course it should go without saying, that an institute man should be one whose business transactions at home will bear the keenest scrutiny. For be assured of this, so long as you are one among many, in your own community, doing neither more or less than the rank and file, men will expect no more of you than the average, but advance a step ahead of the procession, as a man does who attempts to instruct others, and you are singled out and stand in the lime light of public criticism.

SCIENTIFIC TEACHING.

There is science and science, really in essence, applied knowledge. The true scientist, teacher or experimenter will never make the best institute worker. Such men if they be apt to teach, as some of them are, are necessarily in demand by the growing class, who read the bulletins, and are abreast of the times. They—the scientists—are able

to speak with authority. In many sections I would I had one or more always with me, but they are specialists and in most cases do not speak the language, or think the thought of the farmer. Let me say right here, that if we are to be of the greatest benefit to the hearers, we must be able to do that thing. If I have had any success in institute work, it is because I have been able to place myself in the position of the poor man in the back seat, from the standpoint of a hard earned dollar. The young graduate, so full of science that it hurts him, and also full of zeal which we admire, though often it is not according to knowledge, does not fill the bill with the hard-handed and headed farmer, for in spite of Paul's admonition to Timothy "Let no man despise thy youth," unless the young man shows plainly that he has always been taught in the school of economic experience; his youth will be despised. Yet from this class are coming, and must come, the best institute workers of the future, therefore with such, brethren, be exceedingly patient and long suffering, for they should have, and often do have in them the very root of the matter.

The farmers' institute lecturer should always be familiar with the latest research knowledge on the subjects he treats. It is better not to teach at all than to teach that twice two makes six. As Josh Billings says, "Better not to know so much than to know so many things that are not true." Gov. Hoard once remarked to the speaker, "You want to have a firm grip on what you know." I would, however, say as little about science as possible. Should one go to the platform with a lot of bulletins, the inference, on the part of the audience, would be that such a man is speaking from little experience of his own, and I fear it is often right. Have the facts clear in mind and stand by them. I know of nothing more riduculous than to hear a layman get off a lot of scientific terms intended to show his learning; but they leave the impression, in the mind of the hearers, that "such knowledge is too wonderful for them, it is high, they cannot attain unto it," and they go home and feed corn meal and buy low grade fertilizers as aforetime.

A message, a clear distinct statement of facts in simple language, backed up by *the reasons why,* is what tells. The man must have a message. There is a decided difference between a message and a talk. Of the latter there are many. Of the former few. Some men have both. By a message, I mean, a clear definite knowledge of some one or more subjects. One that enters into the very warp and woof of his being, one which he feels will be a benefit to others, and into which he puts himself. It may not always be presented from a rhetorical standpoint, and though this is a serious defect, it is not fatal, but that man will get his audience and give them something too. A talk may be ever so well rendered, but if the soul of the man is not in it, and he is not speaking out of the depths of his experience, what he says will go but little further than the four walls of the house in which he is talking. You have a man in this State, with whom I have done much work. His use of the English language is awful, although he has improved much in the last four years. He speaks so rapidly and labors so hard when doing it, that it is often painful for his audience. But that man has a message, and in spite of his handicaps, people are always glad to hear him, not once, but many

times. He always gives then something to carry away and they know he speaks of what he does know, and testifies what he has seen. I have heen him hold an audience of over five hundred cultivated people, on such a commonplace topic, as a horse's foot or tooth. That man is a power, and I always feel that I have a tower of strength when he is on my force.

Another experience: One young man, a master of English and a good dairyman, as well, spoke on butter making. He described the cream, as a satin ribbon and the butter granules as beautiful golden pellets. From a literary standpoint it was fine, but the farmer's wife, whose cream would not churn, nor the butter gather, failed to recognize in his glowing description, her unripe cream, or too soft, or too hard butter.

He was followed by a man with a message, ignorant so far as the schools go. His bodily presence was weak. Some of his matter was ridiculous, but people listened with bated breath when he described the points of a dairy cow. He knew that he had a message. These men were from the same neighborhood. The first referred to—a very dear friend of mine—rather looked down on his neighbor. At the close of the session he came to me in wonder, and said, "Why he got them and I did not! Why was it?"

BREVITY.

Here is where we all fall down. We become so infused with our subject, which grows upon us, that we find our hour all too short. Except a popular lecture, for the average institute address I am sure forty-five minutes should be the *limit,* and I have laid down this rule for myself and corps for the coming season. However excellent an address may be, the ordinary mind, untrained to think logically, can only grasp a few facts, and spread out too long, they become tired, and fail to get what they might, had it been condensed. It is surprising how one can cut down and still retain the meat.

LITERARY STYLE.

By what I have said under the head of message, it might be supposed that I do not value a well presented theme. No man appreciates such more highly, and the lack of it detracts from the best message. Faulty English is always to be deplored. Remember a man on the Institute platform represents the State, and is supposed to be, and should be, above the average. Among his hearers there are sure to be many cultivated people. "Aint no," "have went," and the like are inexcusable in these days, yet I have heard these and worse. Most men use too many words to express themselves, and their sentences are involved and would not sound well were they written out. Too often there is no logical arrangement of the thought, and I have known those who had no terminal facilities. They simply stopped, never finished. All these things mar. While I would never condemn one, who answered the requirements in other particulars, because of his English, I should labour with such a one to show him the error of his ways. Much slovenly work is due to lack of preparation. I have heard men say boastingly, "I never prepare anything ahead." The fact is self-evident before they finish. I contend no man should think of going before an audience until he has his subject well thought out. While I should seldom go before

an audience with a manuscript, all beginners should write out their address, in order that they may get their matter in a condensed, concise and practical form. I would never commit the whole to memory—this savors too much of the parrot—but I would become saturated with the subject matter, and a few headings, and sub-headings, will easily bring out the thought in logical sequence.

HELP FROM READING.

Much can be done to acquire a good literary style by reading. I fear too many institute men confine their reading to agricultural themes. These are valuable, but as an old friend once mentioned, "I want to meet a man who can talk of something else besides bulls and phosphoric acid," and I say amen. "What shall a man read?" Some of the best English writers,—Shakespeare, Milton, Carlyle, Scott, Dickens, Longfellow and Shelley, not despising some of the best modern novels, as well as history, both ancient and modern, and at least one of the leading periodicals, such as the Literary Digest, World's Work, or Outlook, and then above all the Bible. Not only because "out of it are the issues of life," but because from a literary and historical standpoint, no book can compare with it. So great a writer as Ruskin attributed his fine literary style to the fact that in his boyhood he was obliged to commit to memory many of the Psalms and poetical books and all of Paul's masterly logic in Second Corinthians. In those, who like the writer, reading is ever a delight, I strike a responsive chord, but I know others are saying, "What is the use of all that?" It enlarges a man's vision, broadens his mind, enables him to look on all sides of a subject, increases his vocabulary, and therefore, enables him to present his subject with a force and wealth of illustration otherwise impossible.

ILLUSTRATIONS.

This naturally brings up the matter of stories. I claim to be a good story teller, and if Bob Seeds has any new ones, I want them, but not to tell on the Institute platform, except in rare instances. In most of the places where I have done work the story teller is not wanted. For the time being he has the house, and his stories will be rehearsed at the corner grocery and bar-room and other gatherings, where every solid thing is forgotten. As a matter of fact people get so full of the stories that they have no room for anything else. Deliver me from working with the professional story teller. A story with a lewd or immoral interpretation never shoud be tolerated. I once saw one of the ablest agricultural lecturers this country has, disgust the better part of a large audience at a State meeting, by one statement with a lewd interpretation. The apparent fact that it was not a slip of the tongue, was what made it unpardonable. I think he has never been invited to that state since.

As I see it to-day, a story in an institute talk is only permissible either because it really and forcibly illustrates a point, or is needed to wake up a dull audience. A fact made clear or emphatic by an illustration is always desirable. As a rule the most forcible speakers use illustrations.

What about charts? Always desirable as long as they are not complex, for they are readily seen and comprehended. The mind can take in more from the eye-gate and ear-gate, than by the latter alone. Many things are hard to describe by word of mouth. A picture will show more in a minute, often, than will ten minutes talk. Few formulas can be carried in the mind. From a chart they can be copied. This coming winter, I shall to a greater extent than ever before hand out printed sheets containing tables, directions and fomulas, given in the lectures. Of many charts I have seen, the less said the better. They were fearfully and wonderfully made, and the figures on them might have been taken for the beasts in the Apochrypha. Better none than such.

FOR SUBJECTS.

It is a mistake for a man to try to cover the whole field of agriculture in his address. Better a few subjects in which a man has a message than many talks. If a man becomes known as an authority in some things, his advice will be sought after. People know T. B. Terry because of his potatoes and ———— Todd for his hogs, "Joe." Wing for his alfalfa and "Bob" Seeds for his cow-horn turnips.

A bright young man, with whom I worked in Ohio, was talking on horses and sheep, and doing it well. It was his first winter, and he seemed to think he lacked because he had not a feeding topic. I advised him to stick to his specialties and when he had made a reputation with them, then add the talk on feeding. Several times I have been asked for a man to speak on horses and sheep, and I have been glad to recommend my young friend. Would I ever have thought of him again if he had no specialty?

Avoid many general topics. Some men list half a dozen with titles that attract. I have generally found that no matter what the title the same talk in substance followed. A good wrought out general lecture is a help to any man, and happy is he who has one or two such, but not every man is adapted to that kind of work, and one not so adapted will in no way lessen his value if he sticks to his practical themes.

All of the above contribute to the best institute worker. Did I ever see one who fully measured up to that standard in the wide range of my acquaintance? I have met three or four, whom I consider approached very close to my ideal. Let us remember that the higher we aim, the higher we shall rise.

Over and above all, a man must be of broad, kindly sympathy, whose chief end is not to earn a litte extra cash or achieve reputation—both laudable in their place—but to be really helpful to his fellow-men. The power of such a man will live long after he has gone. I can but express my thought by quoting the poem of Sam Walter Foss:

THE HOUSE BY THE SIDE OF THE ROAD.

By Sam Walter Foss.

"There are hermit souls that live withdrawn
In the peace of their self-content:
Their souls like stars, that dwell apart
In a fellowless firmament:
There are pioneer souls that blaze their paths
Where highways never ran—
But let me live by the side of the road
And be a friend to man.

"Let me live in a house by the side of the road,
Where the race of men go by—
The men who are good, and the men who are bad,
As good and as bad as I.
I would not sit in the scorner's seat,
Or hurl the cynic's ban—
Let me live in a house by the side of the road,
And be a friend to man.

"I see from my house by the side of the road,
By the side of the highway of life,
The men who press on with the ardor of hope,
The men who are faint with the strife,
But I turn not away from their smiles nor their tears—
Both are parts of an infinite plan:
Let me live in a house by the side of the road,
And be a friend to man.

"I know there are brook-gladdened meadows ahead,
And mountains of wearisome height:
That the road passes on through the long afternoon
And stretches away to the night:
But still I rejoice when the travellers rejoice,
And weep with the strangers that moan,
Nor live in my house by the side of the road,
Like the man who lives alone.

"Let me live in my house by the side of the road,
Where the race of men go by—
They are good, they are bad, they are weak, they are strong,
Wise and foolish—so am I.
Then why should I sit in the scorner's seat,
Or hurl the cynic's ban—
Let me live in my house by the side of the road,
And be a friend to man.

MR. KESTER: Mr. Chairman, as I understand Prof. Van Alstyne will leave this afternoon, I would like to move you that we offer to him and to other visiting speakers of this Institute, a vote of thanks for their very cheering presence and helpful addresses to this gathering.

The motion was seconded, put and unanimously agreed to.

PROF. VAN ALSTYNE: I thank you.

The CHAIRMAN: I presume this is the very ablest discussion we have had. It has brought out the requisites of the good and the bad and poor institute worker that many of us have had a great deal of experience and struggle with. I am sure that many of you would like to discuss this a little bit, but I will ask you to just hold on to the thoughts that you have a little while and we will have

another address as to "What Constitutes A Good County Chairman of Institutes." They are synonymous, at least allied subjects, and after that there will be time for us to discuss them both together.

The CHAIRMAN: I have the honor to introduce to you Hon. Howard G. McGowan, of Berks county, who will talk to us a little while on "What Constitutes a Good County Chairman of Institutes."

WHAT CONSTITUTES A GOOD COUNTY CHAIRMAN OF INSTITUTES.

By HON. HOWARD G. McGOWAN, *Geiger's Mills, Pa.*

Mr. Chairman, Ladies and Gentlemen: Judging from the subject announced by our worthy Chairman, Dr. Conard, you might suppose that I possess some secret and that I would have the audacity to come across the State, from east to west, to relate it here. Such is not the case. Just why I have been chosen to speak upon this subject by Director Martin, I am unable to understand, because I have had failure as well as success. The first institute that I held, when we had with us the Hon. John A. Woodward, my friend Mr. Lighty,—I see he is present here—Enos H. Hess, of Lancaster, all grand good men, with elegant subjects, but the Institute was a failure on account of the poor arrangements by the County Chairman of the Institute—and that was myself. That is one of the failures.

To be successful, we must incorporate or inaugurate the individual interests of the people where the particular institute is to be held. Now what I mean by this is, take it in a political sense,—I am not making a political speech. I cannot if I want to. But if we are candidates for office we cannot elect ourselves. We must incorporate an interest or have the people with us. So it is likewise with the successful Farmers' Institute. We must incorporate an interest in the place by the people where the institute is held. Let me illustrate: In passing over our county but recently there was a candidate for office who had tacked his cards upon trees, upon poles, and upon buildings, and I said to a gentleman: "Mr. Smith is a candidate for such office." He said: "I don't know. I did not see him." Next day I passed over another part of our county and I said to another gentlemen: "Mr. Smith is a condidate for such an office." He said: "I can't tell you." "Why," I said "his picture, his card, is tacked upon poles, upon large trees and buildings and all that." He said: "Oh, yes; he passed through here but didn't say anything to me nor to any one in particular."

Now we will take that along with our Farmer's Institute work. Suppose a County Chairman is making arrangements for his institute. He takes his bills and he tacks them up; perhaps sends them around to one or two people in that neighborhood or community saying that we will hold a Farmers' Institute in such a place and will guarantee

you that that institute will be an absolute failure, just as well as I will wager a pint of peanuts that that candidate will come out at the little end of the horn for his office.

Now what constitutes a good county chairman of institutes, in my opinion, is the man who will *do things*. That is, a man who will do things when he cannot get anybody else to do them. The good county chairman must be or should be the power behind the throne or the silent man rather. I believe that you will perfectly agree with me in this respect. You know that if you know anything. But just how to inaugurate the interest of the people is what I think I have partially solved and that is my purpose in coming here and if I am helpful to some new county chairman in some little way, I will feel that my visit to Butler was not an entire failure.

I will give you my method of conducting a Farmers' Institute. I don't claim that it is ideal, but it works out for me and I imagine that the Director of Institutes, Mr. Martin, had some idea that I had a little success, or he would not have pushed me into this position and got me into this predicament that I am in now. Very shortly, on the second Tuesday in June, we, as County Chairmen, will be called to the offices of the County Commissioners in the various counties throughout the State, there, first to arrange for our institutes; that is, to arrange or select the places where the institutes are to be held. That is all right. You know all that. Now at that meeting we do this: We invariably select a local committeeman at that meeting for each place. Never miss doing that. If you simply just select the places nobody is recognized, your meeting sort of falls flat and the local papers have not much to say. But if you select a local committeeman and chairman, the local papers take it up, publish the proceedings and somebody is recognized and interested. After that there is not very much work to do until we commence to arrange for the institutes. About six weeks before the time for holding the institutes I commence to get very busy. I do this: I correspond then with this chairman who was made at the time and places for institutes were named. I make an arrangement to meet him at a certain place, day and the hour named. I have never missed an appointment of that kind. I say to him, now call in your farmers, call in all those who are interested in the success of the Farmers' Institute. And he does so, and I have had as high as twenty, twenty-five and thirty of the live farmers at that preliminary meeting. He also sends out postal cards informing them of the meeting and why they shall come and make arrangements for the Farmers' Institute.

Now a step backward! By this time the Department has sent me the posters and the printed matter such as they send out. I have already, previous to this, taken these posters to our local printer and had him very nicely execute and insert suitable type where is is necessary, stating the day and place of holding the institute, together with the names of the speakers, all nicely printed in that bill. If I hold four institutes and the Department sends me 100 bills I have 25 for each place. I tie these up in a little roll and I have a bunch of the Farmers' Institute Bulletins with me, and I go to meet this pre-arranged gathering. I preside there myself, call the meeting to order and tell them the object of the meeting. I take the Farmers' Institute Bulletins and I say: "Now, here, gentlemen; we have Prof.

Lighty, from East Berlin, Adams county. He has five subjects, he has eight subjects, or whatever, and we can select five of them. Now, gentlemen, whatever subjects you want in this particular community you just tell me. This will interest every man. I came here to assist you. They will all get busy and I distribute half-a-dozen Bulletins to these fellows and we all have something to do. We read over these subjects nicely and carefully and pretty soon we are so much interested and they select the subjects and I mark them down. We take the next speaker and we go over his subjects and we all have a say in the selection of the subjects they want at this particular place. I say we will now have the chicken man, Mr. Wittman—probably we are fond of raising poultry. We also have the scientific fellow, Prof. Mair. So we select the subjects and all have a chance and a say in the arrangement of the program. Now we do something more right at that meeting. I say to those present: Now, gentlemen, we intend to send out about 100 postal cards. We will commence right here to select names and we will make a circle all around the section where the institute is held for a radius of four, five or six miles. I say, now if there is any person here handy with the pencil they will set down and take these names down. There is always some one who will do that. So we commence to go around this whole section and they will mention names as fast as the secretary can write them down. So every man has a name to suggest. Send this man a card, the other fellow a card, and those present have all been doing something and been thoroughly interested. Now this is the card (showing). These cards are sent out independent of the cards sent me from the Department. They seem more original. There is always inspiration in numbers and I take it that the successful institute must certainly, in the first place, be well attended and this is what I am at, to get a well attended institute. (Reads):

"Dear Sir:

You and your family are cordially invited to attend the Farmers' Institute, to be held at Reading, Pa., on Friday and Saturday, February 19th and 20th, 1910. Speakers will be present from various parts of the State to talk along agricultural and horticultural lines. Farmers this is your meeting. Come and hear the various subjects discussed, relating to dairymen, potato culture, fruit raising, poultry, etc." (Signed by the local Chairman in that community.)

All nicely printed. That makes the local chairman feel good and personally interested.

At that meeting we do something more. We create what we call an executive committee. I take this chairman, who was made chairman of the local committee at our meeting where the institutes were named, as chairman. We place five men on that committee. Then we have a larger local committee. That committee may be increased probably to 12, 15 or even more. We name the query committee at that time. In fact, we pretty nearly make the entire program. Now when the meeting is pretty nearly over, and by this we have had quite a nice little time together. I now unwrap these bills I have there. We have a nice showy type—a finished bill—no blue pencil mark or anything of that kind that looks cheap. That is not attrac-

tive. You all can do that. The Department is doing all they can in this way, but the printer only charges a small sum for making additional type and that goes along with your expenses. I say: Gentlemen you will distribute these bills as much as you possibly can, covering all the ground. Now, I told you we have 25 bills and almost every man goes away with a bill, some with two bills, some with three. And they will discuss these and they will say: I will take this bill to this place and this bill to that place. We have all had a hand in the arrangement of the institute and I tell you, my friends, that is the secret I have had in the whole thing, and that is the particular message I want to bring to you today. After you have done that you have broken the backbone of what I term the success of the Farmers' Institute. It works its way out splendidly. You have 25 or 30 men to talk farmers' institute right from the start. They will talk with their friends and put up the bills. But, as I said before, if I simply went into that community and called the chairman or local committee together and he and I had a private conversation together like happens sometimes, it would have been between us and that would have been the end of it. I haven't had a failure at all since I have adopted the plan just described.

Now should a good chairman preside at the institute when held? This is important. I have presided but I have learned this: Not to do things when I can get the other fellow to do them. Sacrifice yourself every time. Right here I want to read a little letter that was gratifying to me, that will bear me out on what I say. I want to prove things as I go along so you don't think I am here just talking. I received this letter after an institute was held in my county, Berks:

"Dear Mr. McGowan:

> I am very much interested in the work of educating the farmers in better methods of tilling the soil and hope to be situated soon that I may be able to demonstrate from practical experience the truth and wisdom of many years recommended by these men at our farmers institutes. Accept my thanks for *your* courteous treatment during our institute, much more than I or we deserved. I told a company of my friends last evening that I entertained the very *highest* regard for you, because you seemed to be so deeply interested in this work, and that you were so generous that you took pleasure in giving *others* credit for more than they were entitled to, reserving nothing for yourself."

Now, gentlemen, I contend that this is the position that a good chairman should occupy. He should be the "power behind the throne," and only do things when he cannot get anybody else to do them. It is not safe, however, to allow an institute to be in charge of *some* chairman. That probably would not be wise. It is safe to select the best man in the community for the local chairman; but almost any man can preside as chairman provided the county chairman holds his hand upon the throttle and has tact. That is what we must have. We must know every move that the institute is making, feel every jar that occurs in the meeting, although you can be silent

and guide all this; and the chairman in that community will feel that he is honored and that he is respected and that the county chairman is not doing all the work and that he wants to be the whole push.

We are generally active with the query box. I make that a feature at our institutes. The chairman of the query committee is not an idler. I emphasize the question box and insist on asking questions. Get people at it. They will be slow at first, but get them at it. The chairman collects these questions. Now then I have another man, who is a good reader, at that institute. He comes front and he reads these questions. So that gives somebody else something to do.

So all in all, gentlemen, you see that a good county chairman must be the power or should be the power or like the silent partner of a business concern who is sometimes, or generally is, the strongest controlling factor in the business. A good county chairman should be a sober man; he should be honest, truthful, diligent, charitable, always having regard for the other fellow, forgetting yourself, imbued with the responsibility of teaching and leading men to learn and to love agriculture which, my friends, is at the very foundation of all the material wealth and prosperity of our country. As we came over the railroad to Pittsburg, I and Brother Lighty sat upon the same seat, and as we passed by these great iron plants, we conversed together and we almost came to the conclusion that they seemed to be the main spring of the prosperity of the country when we saw the twining smoke going heavenward. We went on to Pittsburg and by the adjoining places, gazed at the gigantic buildings, many stories high, and listening to the hum of these mills and factories we almost came to the conclusion that *that* was the mainspring of the prosperity of our country. Again thoughts took me to Washington, the seat of our National Government, and beheld the vaults of the United States Treasury, and I began to think is this the secret of our prosperity; but I made up my mind that it was none of these things. While I regard these things as all important and necessary; yet, my friends, the real seat of the prosperity of this country is in the cultivation of the broad acres of our great State and the United States, the products of which produces the greatest wealth which feeds the world.

A good county chairman should love his work. A man who does not love farming should quit it. The man who loves his business will be a success. The lady or gentleman who loves to teach school will be the best teacher in the community. Now in the spring of the year, when the birds sing and the grass grows, we imagine that every live teacher is anxious to quit their schools. Just this spring I met a teacher and I said: "Bessie, you have only three days yet and I suppose you are very glad." "No," she said, " I love to teach;" and that is one of the best teachers we have in our township. So a good county chairman must love his work and love to do things, and must have an interest in the other fellow. If he does not love the work and like it, he had better quit, resign and let someone else take his place.

My friends, my brother county chairmen let us combine the best qualities, the best efforts that are in us in performing this great work that is given to us in this high calling of managing farmers' institutes in the various counties of this State. Let us combine these qualities and all the best efforts in us as much as consistent with our

active work upon the farm, and then I am sure and believe that we will be judged as men among men in the great Commonwealth of Pennsylvania. A good county chairman should be a rich man, as I think sometimes; not very rich; just about rich enough to board himself and work for nothing.

The CHAIRMAN: You have heard very ably discussed the vital elements of success or failure of the Farmers' Institute work. Now there are lots of men here who have had a great deal of experience in the same line of work and there is quite a little time yet before the closing hour and we would like to have this matter thoroughly discussed. I am sure we will have a great deal of light thrown on this work, a great deal of enthusiasm imbued in us, if we have a thorough and free discussion of this subject. In order to get around, I would ask that you don't occupy the floor more than perhaps five minutes at a time. We will not hold you down to one or two speeches if you want to come to the floor again.

MR. NORTHRUP: I would like to discuss the Institute Chairman for about five minutes and I think I know something of what constitutes the good institute chairman. I have had the privilege of visiting a good many of them during the year, but I don't want to say anything in regard to what has been said by my Brother McGowan. He has told about what is done in advance of Farmers' Institutes and all that. I would just like to talk a few moments on the personality of the Institute Chairman himself.

Now, in the first place, the chairman, in my judgment, is a fellow that has got to know just what to do next. He is never to be surprised. He is never to come into that place without a whole lot of premonition. I tell you that I do not believe that it can be successfully done on the inspiration of the moment and yet that helps a fellow wonderfully when he sits in the chair. You may ask the question this afternoon what do you know about the chairman, that that is not your business in the Farmers' Institute. I have been chairman in my county for ten years. I have seen a lot of institutes there and I have had a whole lot of different speakers there too. But I tell you the best thing of it all is to know just what to do next. You are placed sometimes in positions in which things come up, things you don't look for, and the institute chairman wants to be pleased all the while, and in order to do that, do you know that he has got to do a whole lot of thinking before he comes to the institute. I believe, in the first place, that the chairman ought to be the president of the whole show himself. I do believe that the man who is elected for that place can fill it better than any substitute, and the reason is that he knows all the names, and all the corners and all the circumstances, and he knows just when they are coming; and the fellow that you substitute and put in that chair never sees them. He has studied these things all. But he wants to know the speakers who are coming to hold that meeting. A whole lot of them may be strangers to him and he has got to get into communication with those men before they come on to his field, and must tell them how to get there and what they have to do when they get there, by sending them some programs so they will know what the business is, and not have them spend time running around the

country on different railroads to get there. There is a great deal in knowing just how to handle them when they get there. There are a lot come there that can state but just a little and they want to be helped to say something more. There are a lot, as my friend said, that want to say everything, and they have no time to do it. The nice point of the whole thing is, to know how to stop those fellows without making them angry, and the chairman has to study this matter so he knows just how to do it exactly; and it must be done. I tell you that I know lecturers come into the work when they were making everybody uneasy and nervous, and the chairman could just with a little skill stop them right there and the institute go on. Sometimes you have to do it with music. It is good to have music in so you are ready. There is this about that; that this chairman must have an understanding with his lecturers. He must know just what they are. And do you know if he is not acquainted with them and has got to come and meet them somewhere before they go on the floor, he can do it.

I know the institute chairman in these counties, and I say on the whole they are the best class of chairmen you can scare up in Pennsylvania. I don't find fault with them, but there are a few I would have remodeled a little. But I say they must have an acquaintance with these speakers when they come on the ground. How do you do? I know one chairman in this State of Pennsylvania who came, when the speakers came after dark, and came to the hotel, and he had a hotel provided for them, and I know that chairman rode five miles to see those speakers before they went to the institute, and some of them he called up in their sleeping rooms to talk to them and know their temperament, and unless he does this he is unable to make his institute a success; and when he does know this he has confidence in his men and he sees they are there and he is not disturbed because he knows the institute is going to start the next morning with these men, and he knows just where to put them and he knows just the right place to put them, and he just carries it out according to his knowledge. Now this chairman has got to be master of the situation. I will just illustrate that chairman by a few words: There was a certain family that has family quarrels and the husband and his wife were just into it in earnest when there was a caller knocked at the door and he said he would like to see the head of the family, and the man went to the door and received and he said to him: "You will please excuse me for a moment for we are just in the midst of a quarrel and cannot be disturbed." We must know who is master of the situation. Then that matter has got to be attended to so that you can understand that the man who stands at the head is master of the situation.

MR. BARNES: I have done away with the query box in the institutes in York county. I found that it was a thing of the past in that county. I usually have two or three people designated as a committee to collect these questions, and the minute any person writes them out and holds them up the boys do something, like the pages in the House of Representatives, and skip down the aisle and get them and they are referred to the party on the platform, or to

whom addressed, and it has been more successful that way than with the box. And another feature I have made is that when a question comes into their minds, that they spring it at the speaker while he is speaking and this has proven satisfactory.

Now, in regard to the attendance at the institute, I never had a failure. I had one institute "fall down," which is considered a failure. On the 2nd Tuesday in June I immediately go to the 'phone and call up the leading county newspaper offices and ask them whether a representative will be at the Commissioners Office at one o'clock; that we had already advertised this meeting in their paper and it would be well to come there. They come there and take the proceedings of the meeting and we keep in touch and have the good will of these newspapers from that time until the last day of the last institute in our county. These representatives go through the entire county at the expense of the newspaper offices. They pay their own hotel bill and car fare and report every day of the meeting and report to the satisfaction both of the people and the speakers on the platform. At the close of each day's proceedings, they publish the institute program for the next two days and next point. I venture to say that there is not a cheaper advertisement can be thrown out in any county, and if the new county chairman, who is getting in the work for the first time, will take hold of the matter in this way he will find it satisfactory in every county in Pennsylvania.

MR. SEEDS: I would like to say a word in behalf of the institute workers. "The Requisites Necessary for the good Institute Worker," is the way the question is. After the message has been acquired and the man believes and he is then in earnest so that he can tell it, the rest of it is like a balanced ration for the cow; what is the balance for one cow is not the balanced ration for another cow, and what is necessary for one man is not necessary for another. I know that I am known all over this country as being the biggest liar or story teller. I would not take $5,000.00 for that reputation. Unless I miss my guess, I propose to give to the United States the means for making poor soil fertile, that will make cow horn turnips, cow peas and soja beans look like thirty cents, and when I do it I propose to tell it from Florida to Maine, from the East to the West, and when I do it I would not take $5,000.00 and have the stories out of that message when I am done.

There is a reason for that. Now it is all right here when we have an audience here, when the teacher has the scholars in the school house. They cannot get away. You have got them right here. You got to stay here whether you like it or not. But you take the big audience where they have been running the Chautauqua for twenty-two years and they have been hearing everybody who comes down the pike, they go there with a book in their hands, with their fancy work and newspaper, and you either get that mixed audience or you don't get it; but I would not take the price of a lecture and stand up in an audience like that and have the speaker say to the audience, the rest of the lecture is just what you have been hearing. I would not take the price of a lecture and talk to that audience with a man reading a newspaper when I talk to him. When I talk

to the man I want him to look me in the face and I want to see him and I want to tell you that this is the success of the lecturer. And it is something when they say, "Seeds you are the only man here that has something that stops the talking and parading around of the audience." There are county chairmen here that I am looking at that come to me and say, "Seeds, you are all right, and the only man that can do it." That is all right; you leave me alone and I will take my hard road to market and I will be responsible. Somebody else can't do it, but you can not buy me to take stories out of my lecture, and I want to tell you that if with every story I have not got a message I want to quit the business right there; and I would sooner take a dig about talking too long; but I want one man to get up and say that I could not be brief when it was necessary in speaking. I can always do it. But you give me three-quarters of an hour to make an address and I will take thirty minutes of that to interest a man and get him to look at me to give me the other fifteen minutes to impart to him what I can. Now somebody else cannot do this. I will be honest with you and say to you that I would not travel in an institute gang that had two more Bob Seeds' in it besides myself.

The CHAIRMAN: Neither would I.

MR. SEEDS: I tell you that here is where we ought to be honest, if we are any place under Heaven, as workers and it is right here. I want to tell you that I love this work just that well that though I can sell all the time Mr. Martin is taking, I cannot do that. That is right. And I have got something else to work at, and you mark my word: Inside of two years I will say it and will stand on my feet. But now this is all right. I just want to define my position as an institute worker and one of the biggest liars in the State, and I want to say it and I am not going to apologize for it but keep following after it and talking Bob Seeds' success. I brought two new stories from Arkansas and I didn't get a chance to use them right until they got away from me and I found that the Secretary of Agriculture went out and told them.

But I want to tell you that back of the whole thing is to get this message and when you get it, gentlemen, you must believe it yourself. If you don't believe it yourself you cannot tell it. And you have got to be honest, and that is what I always try to do, to be honest in what I say and have the message between the lines, and that fellow has got to lay down his newspaper and that fellow quit sparking his girl when I talk to them. I tell you that I never said this before; but fifteen years ago when I got my experience in a little speech and had it ready, I went up to Cresson to an instructor from down here in Pittsburg and listened to him for ten days to see how I could tell that message and tell it right. The only thing is to be honest and believe what you say. As long as you tell people something they will listen. When you get ready to say a new thing you may be told, don't dare to say that; but you watch me in two years from now, and I will stand up until somebody makes me lay down. It is the greatest thing to make poor land fertile that was ever discovered. These fields from here to

Pitsburg ought to have it now. I want to tell you that I just want to stick a feather in my cap and say I am one of those Pennsylvanians that put the land around the house and came to the institute with a clean face, which they didn't do last winter. Think of a community in Pennsylvania where the farmers came to the institute without washing their faces or taking the tarnish off his harness, and would not think to begin to take a bath from spring to fall. Every farmer ought to take a bath every spring and fall whether he needs it or not.

MR. WATTS: In regard to the honesty of the institute worker and the man relying upon himself, I feel that the work in our State and elsewhere is weakened by men using the same language and the same stories to explain their thoughts that other men in the same field have used for years and are using still. At State College or elsewhere the boy that I admire the most is the boy who retains and keeps with him today his originality and particularly if that originality and personality is good. I believe that the institute worker, as Prof. Van Alstyne has said, should have the confidence of having done these things himself, tell the story in his own language and illustrate his works in his own way, so far as possible, and that they will have better success as a whole as workers. I believe that if the Creator had intended us to be parrots we would have had crooked bills and gay plumage. It would be better for us if we would retain our originality in doing our work over the State.

MISS BAKER: Gentlemen and Ladies: Our good State Superintendent of Farmers' Institutes furnishes one especial injunction in his instructions to us. It appealed to me especially when I thought of coming into the work because I had been a school teacher and a school director and practical farmer as well. That injunction is that the county superintendent of the public schools of the county shall be notified of the meetings and be urged to attend and take part in the proceedings of the sessions, and at least one strong educational session shall be held. I feel that I have been only a partially acceptable worker, but in that little while I have been in ten counties of the sixty-seven in our State, either as a worker or guest. In no instance have I met the county superintendent of the county. I am going to be very frank with you. When I arrived in Butler my first question was, "Does the county superintendent have his office in this building?" "Yes." "Where it is?" "He cannot be found," he will say, for he has been in Washington attending the Sunday School Convention, and I dare say that the work is very heavy, that it is absolutely necessary at the end of the school year that he should be out in the field. That is an exception and therefore excuse, the pressing business.

But, gentlemen, that does not excuse any other county in which I have been. We are losing sight of the very vitality of our work. Just as I said when I came here first, we devote our time to teaching "old dogs new tricks." We want to go right in and teach that to Young America and we find them or should find them right in our schools. Wherever I have gone I have gone pretty nearly as soon as I reached the town to the schools. In one instance, in Lebanon county, I found not the county superintendent, but a live superinten-

dent of schools in that town. When he opened the door to my knock, he held in his hands a copy of a text-book on agriculture, and he opened the door wide when he knew who I was and asked me to come right in. He said that they were going over the program. He wanted his high school class to be ready to put questions in the question box and they were having a live discussion. That class attended the institute and they entertained us with music that they had prepared for us, and when these questions were read out our good Dr. Conard, who was with us, answered them pretty solemnly, supposing that they had come from the audience before him. I asked him afterwards if he knew who had asked them, and he looked at me in an innocent way and said, "what do you mean;" and I said, "Doctor, they were from the high school;" and he said, if he had known that he would have gone back and spoke to them. That was in Jonestown, Lebanon county. That man has gone out of the teaching profession into the church and we have him now in Chester county, a Lutheran minister, and we are going to see whether we cannot still get some inspiration from him. I do believe that we should pay more attention to the suggestions Mr. Martin makes to us; that we should teach the way, the work of public education; have the schools come to us and go to the schools, and see to it that all these papers, all these texts about teaching agriculture are supplied them.

MR. KESTER: Just a word in the way of emphasizing one point Prof. Van Alstyne suggested. I am always sorry after an address or series of meetings in which there is not in all that has been said and done an appeal to the cupidity or mercenary spirit of these persons. Always sorry when there is not something done or said that will arouse the drooping spirits or faint heart of some farmer. We must not put all our efforts of thought into showing how to make more money out of beef or pig or dairy, but while doing that give something that will create renewed interest and give power to the individual. Just to illustrate: I remember the first term of school I taught, beginning when seventeen years old, in a little old schoolhouse which was crowded with forty-five pupils, many older and larger than myself; and how after six or eight weeks of the term had passed I felt that I was failing and that I was not equal to the occasion, and how after dismissing the school one afternoon, I sat down by the desk and bowed my head and tears fell, and how the county superintendent came in unawares and put his hand on my shoulder, and realizing the situation, the brilliant man that he was, he spoke to me and he talked there for half an hour, reviving these drooping spirits, and I finished that term with success and for fourteen years after. Now he did not tell me how to conduct one class in arithmetic, algebra or geometry, not one thing there, but by something in the man aroused what I needed to bring on the success. And how after a few years of farming, how after I had passed through the greatest calamity that can happen to man, things looked gloomy from every point of view, and how with broken spirit I was about to give up, when an old German peddler came along and in German asked to stay all night. He seemed to appreciate my feelings and my position, and through that German peddler that night I received an impetus that gave me a hold on the ambition to be a far-

mer and a success, and as to how I may have succeeded you and my neighbors can tell. Sometime ago I received an answer to a letter to a Western editor, and he says when you have a message that will cause the poor man or woman to sit up and read it at night through the light of the dim lamp, sent it to us; and this is simply in a word what I want to carry to you fellow-lecturers, that in that message there must be something that appeals to the inner man and the higher sense than simply how to make more dollars and how to even make more blades of grass grow where they are growing now. That belongs to our work and the man who can do that who does not bring with it the spirit that will do it is more or less a failure as an institute worker.

MR. JOEL HERR: I hardly know which part of the question to take up, the duties of the chairman or the duties of the lecturer, so I will try them both. I want to answer Brother Seeds, however, in one particular. I am older than he, but I listened to stories that they told long before he told stories, and I heard him tell some of the same things.

I want to say, it is the duty of the lecturer not only to put down and talk about the money questions on the farm and be master of the situation—that was a most excellent address of Prof. Van Alstyne—I just want to emphasize this, however, that we want not only to bring out the full points of how to make farming successful, but want to teach people that farming is the best, the noblest and the best work that man can be engaged in. We want to get the man enthused in his occupation and respect it, and if he don't respect his occupation he better be kicked out. It is the enthusiasm we get on the farms, as we learned from the judge, and the bright minds we pick up and learn to cultivate. It is those things which make farming desirable. It is not all in money. We can have the best homes on earth, and we want to teach the people that they are the best people in the world, got the best chances and live the happiest, and we want to teach them to respect themselves and their occupation. It is an important part of institute work.

MR. McCLELLAN: I want to say a word on behalf of the institute manager: That I find before your institutes are successful you have got to make calculation to sacrifice time; get out in any weather that is, to provide places for the speakers when they get there, have places for them to stay. I find they have a pretty hard siege in getting around and then when you get them there you take as much out of them as you can. In regard to the speakers, they should know enough that when they are not entertaining the audience they should understand human nature and go to studying up some other branch of industry.

MR. BLYHOLDER: I want to endorse what the last speaker has said, and I also want to endorse what Brother Watts said, that every man ought to be himself. In regard to the speakers a great deal has been said. I want to speak a word about these stories of Seeds'. Brother Seeds made quite a good impression in my county and told many truths. The very next year the first day's institute I had

was at one of the same places Seeds had been and the first speaker got up and told three stories that Brother Seeds had told there before and the audience all commenced laughing at him and were disgusted. He could not tell the stories, so that he had better been himself. And the man should be himself also in this; that he should talk on the subject. On another occasion, in my second institute, after hearing a talk one day, the next day I took out my watch when I introduced the speaker and it was just 19 minutes before he struck his subject. Now it seems to me that is spending valuable time for nothing. I believe the county chairman ought to be a man who is able, if he presides, or whoever he may have to preside, ought to be able to introduce that lecturer properly, so that he may in his remarks inform the audience who they are, where from and what they are going to talk on and then it don't take 19 minutes for the speaker to talk about something else before coming to the subject. He ought to proceed to his subject at once.

Upon the matter of the county chairman, I have been proceeding considerably along the line as outlined by the first speaker and I think it is the successful way. However, I find that in some localities we have to apply one tact in order to get the people interested, while in another we have to apply yet another tact so as to get them interested. The county chairman who cannot hold the confidence of his people through the county so that they are anxious to meet him as well as the speakers, I say ought to resign.

The CHAIRMAN: I just want to tell you what a professor at West Chester once told me. It seems to me it hits because of some of the qualifications of the institute lecturers. He said that a man to be a public speaker must fill himself full of his subject, throw open his tongue and let nature do the rest. That is what we have to do, retain our individuality and don't attempt to do what somebody else has done but we are far from being qualified for.

MISS BAKER: May I ask if Dr. Phillipy is to be called upon for what the county chairman can do in between institutes—

DR. PHILLIPY: May I ask what the good sister requires of me?

The CHAIRMAN: Your experience with the Boys' Corn Clubs probably.

DR. PHILLIPY: It seems to me that that would be a considerable way off from the subject this afternoon. Now I believe that we heard in that eloquent address from the brother over the State line that we ought to stick pretty close to the discussion, and I don't feel as though this was the time, however much I would like to gratify the good sister's desire, but this is the time for talking about conditions.

MISS BAKER: Not especially about Corn Clubs but what a county chairman can do besides the arranging for meetings.

DR. PHILLIPY: I believe that Miss Baker is possibly mistaken. I am not the county chairman from Cumberland county. We have a good Presbyterian minister who is county chairman and he has

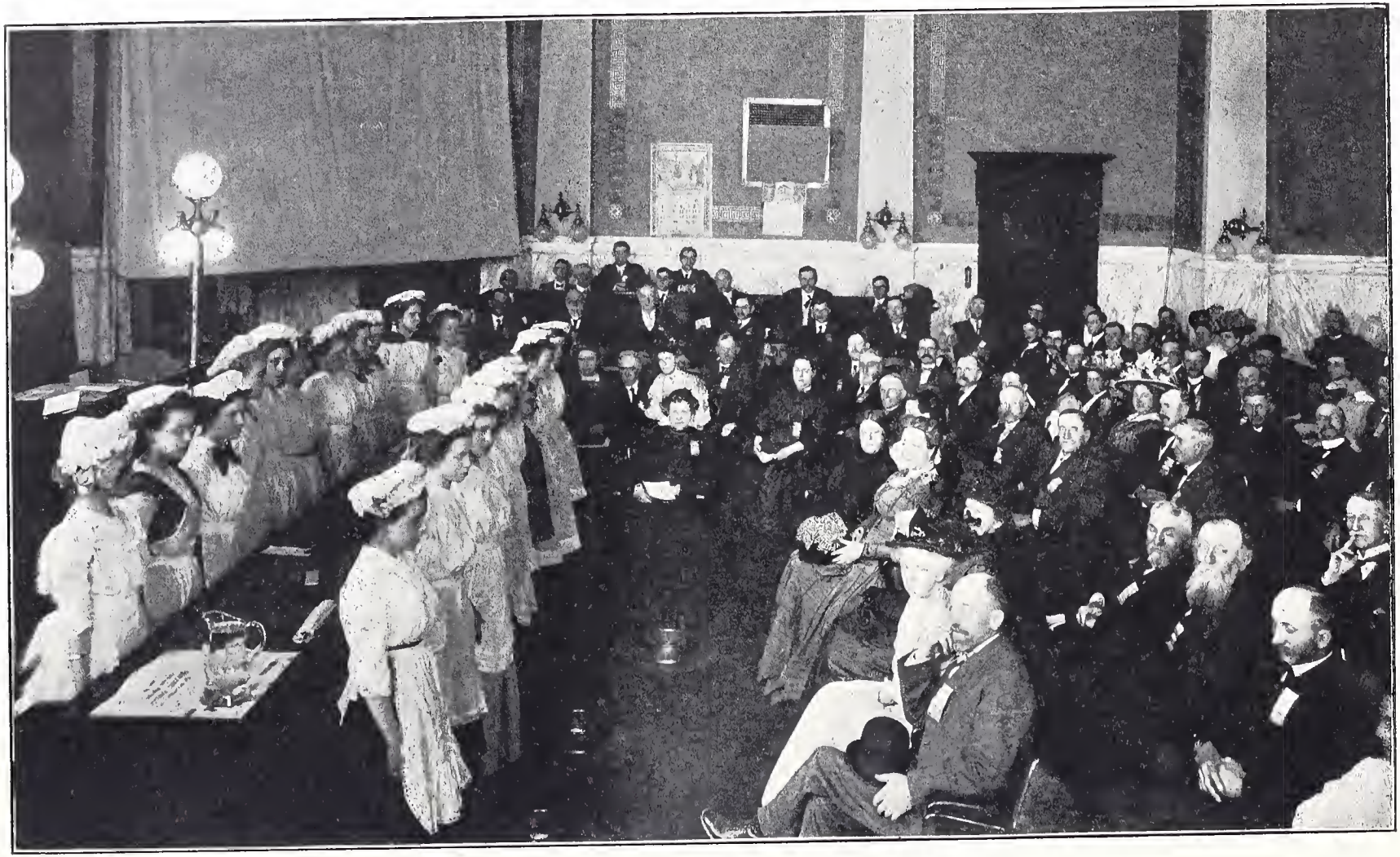


Fig. 3. Women's Session, Illustrating Domestic Science.

made us a most excellent one, and I believe that all the State lecturers who have had the privilege of coming to that county will bear me out in that statement. I would be very glad to give at any time any information along the line of Boys' Corn Clubs when suitable.

SECRETARY MARTIN: If I remember correctly, there was a time set, four o'clock, to visit the farm of Colonel Campbell. Now it seems almost impossible that we should break off this interesting discussion, yet we ought to be an organization that would keep its word and promises. Possibly we may be able to take up this discussion at the forenoon session tomorrow.

The CHAIRMAN: There has been an arrangement to visit the farm at four o'clock and the time is already a little past. It will be necessary to limit this discussion and adjourn in order to keep our appointment, or nearly so. Before adjourning I want to say that anyone who is here and not registered will please do so in the hall in order that vouchers may be sent them. Also, proofs of the photographs taken yesterday at noon can be seen in the rear room or in the corridor, and they can be secured from the studio, 215 S. Main street, Butler, Pa., for $1.00.

This meeting will stand adjourned until 7:30 this evening when the Ladies Session will be held.

Thursday Evening, May 26, 1910.

Mrs. Martha E. Martin in the Chair.

The PRESIDENT: We will now come to order. The first on the program for this evening is an address on "Mothers as Chums," by Miss Arabella Carter, of Philadelphia. Miss Carter is correspondent for the *North American,* has been manager of the business of the Girls of the Universal Peace Union for ten years and has recently been elected a school director.

Miss Carter's address is as follows:

MOTHERS AS CHUMS.

By MISS ARABELLA CARTER, *Philadelphia.*

Recently I heard a girl say in speaking of her letters to her mother and her replies: "I usually begin mine 'Dear M.', and she hers 'Dear A.' We do not bother with mother and daughter; we're 'chums,' Mamma and I." This expression set me thinking, and as I talked to that girl who had her mother for her "chum," I learned that which caused still deeper thinking and I wondered how much teach-

ers and advisors of the young—and even mothers themselves, actually understand of girls anyway. Do they not too often leave their own girlhood days far behind them, and of forgetting their own early aspirations, joys and troubles, fail to bridge the gulf of years between them.

Some dignified, elderly hearers may have a wholesome horror of anything which would seem a retrogression from the old-time filial reverence, the absence of which is so much deplored to-day. And I grant "Dear M." is a long way off from "most revered mother" of "ye olden time." But let the reverence be in the spirit rather than in form if the 20th century girl cannot accommodate both, but I believe she *CAN*. I ween the true love was not lacking in that girl for her "mother-chum." "Why," she said, "when I was home and went to parties and all sorts of social affairs, a large part of the fun was telling Mamma about it that night as I undressed, if she was waiting up, as she often was, or the next morning as we worked together, for she was just as much interested in all the little details as I was. She never sneered at our frivolity, but enjoyed everything with us. When we had company Papa and Mamma were a part of the crowd as much as anyone, and the young folks used to say 'there's no restraint up at B's.' There was no sitting apart in another room for them, nor was it thought of or desired by anyone. If by any chance they were away a ready inquiry was made and a genuine regret expressed." "And when I left home," she continued, "to make my own way in the world and went home at the week-end, there was so much to tell of what happened during the week; and I'm sure they looked forward to my weekly budget just as much as I did the saving up things to tell, and they were just as sorry as I when anything kept me away. Why, it was a standing joke about Mamma and my talking until 12 or 1 o'clock on Saturday nights, that she kept me up as late as my weekly caller did!" "Yet," and here I noticed her thoughts traveled back to the beginning of our conversation, as a thoughtful, tender look came over her face, "I do believe I cherish most those occasional letters who Mamma calls me 'dear daughter,' for I realize then that is the title only one person in the world can use to me;" and the tears filled her eyes at the thought of that father so recently called from that loved home. "And if I feel so, perhaps Mamma does too for the same reason, I'll see." Here I saw the ready willingness to give up the "chum" for the "mother," if so desired.

But I know all girls have not this close companionship, and I pity them. Some may have been deprived early in life of their mothers, never knowing in their own experiences the possibilities of a mother as friend and confidant. Others there are who do not live so close to the mother in sympathy and love; perhaps it's the mother's fault, perhaps the daughter's.

I like the word "chum" in this connection, it means much. Perhaps it embraces more than any other could possible do in portraying certain phases of relationship—sister, friend, confidant, all in one—a nearness that, dear as the word mother is, could not be covered by that alone.

Some days ago while coming into Philadelphia on the train from my home in the country, I chanced to overhear the conversation of two mothers seated behind me, and each gave due credit to the

lovableness of the other's child—a thing not too frequently done. And as one mother spoke of her daughter in her social relations with her young friends, and told of the little merry-makings and parties, she dropped this remark: "I try to keep very close to Ruth and am with her in her pleasures; I do not feel it detracts at all for her friends look upon me as a sort of sister of Ruth rather than in the relation of mother; we're very chummy, Ruth and I." O! how I rejoiced for Ruth. Having always been surrounded by this love of her "mother-chum," she cannot realize what many of her friends lack—cannot see the emptiness of other lives where the mother does not fill the place as in her own.

Here we have the attitude of the mother who is "chum" to her daughter from the mother's point of view as we had it previously from the daughter's. And the little glimpse into the home-life vouchsafed opens to us the beauty of comradeship, is it not beautiful? Can we not picture the heart talks of that mother with her girl?

Just here let me speak of a little story I read some years ago, a part of which has remained with me ever since. I do not remember the author or the name of the story, but the point is this. A girl surrounded by the loving atmosphere of a good home, where she was watched carefully by the right sort of mother, went to visit an aunt and there met a boy just reaching young manhood, who, as a baby had been left on the poorhouse steps, and growing older had found refuge with this kind lady. He seemed to have within him beautiful thoughts which he wove into stories, and had one he was reading to this young girl for her to pass her opinion. He had reached a point where he spoke of the mother in the story when she interrupted him with: "why, you have not made that mother half good enough, my mother is far better than that." John replied, "That is quite likely, I have never known a mother, this is only my ideal of what a mother should be, while your mother is God's ideal of a mother made *real*". Can we not learn a lesson from this? Are we not too apt to feel when discouraged that our ideals can never be reached, that they are too high, forgetful that our ideals are never too high to become God's reality.

Girls, do you say, "Oh, well, my mother does not take the same interest in me that those girls' mothers did." Are you sure? Have you proven the truth of that statement? She may show her interest and love differently, but if she be a true mother it is there. Give her a chance to show whether she cares for your confidence. It may seem strange at first to seem to thrust it upon her apparently unasked, but under the calm exterior there may be a hungry heart-aching for this which you alone can give. Do you not go to her with your troubles sure of sympathy and help? Why not with your joys as well? I'll guarantee that in the majority of cases her heart will respond readily. It's worth the trial anyway, won't you try it?

Yet there are mothers it's true and "pity 'tis, 'tis true," who are too much engaged in having a spotless home or in fashioning fine garments for their girls, thus expressing their love for them, forgetful of the fact that the young hearts under these gowns are starving for sympathy and love, unmindful of the fact, too, that they are driving these same young souls to find companionship in a "chum"

less safe, less helpful. Mothers! May I ask you to pause ere it is too late, and meeting her half-way, endeavor to be a "chum" to your young daughter who, tho' "bone of your bone and flesh of your flesh" must have someone to "tell things to" and talk things over with. Let that someone be you. Do you feel you have done your duty when you have provided for her temporal wants? That as a growing girl she is not to be considered in any way a companion? Do you think she is ever and only a child until the larger experiences of life come to her and then you suddenly awaken to the fact that she is a woman—a being like yourself. And then you are amazed at your blindness that you did not see the quiet unfoldings of that nature ever before you, and you realize that the period 'twixt childhood and womanhood has been lived without you. You have failed to help her interpret the messages along the way and you have lost forever the close companionship both for her and for you during that precious time which cometh never again. If you have another daughter, will you not as a child cultivate her sense of importance to you? Try to make her a companion and she will readily respond and be proud to be considered of value to you. I recall an incident of my little niece not yet ten years old, when her mother was sick and I was for the time taking her place, I had considered her a little fly-away without much thought of anything but play, but as I consulted her about minor points—the dishes to use, the way we should do things, etc., in order to make her feel some responsibility, I was amazed at the womanliness manifested; she was rising to meet my needs as she saw them in a way of which I had not deemed her capable, and I called her then and since by the name which has, perhaps, more than any other, endeared Louisa M. Alcott to us, that of "little woman," for I saw even in that little child the spirit of helpfulness which must exist in every true woman.

When your daughter goes to a home of her own, then your interests are more similar I grant, and your experience can teach her much in the new work of managing a household—and a husband. But much as a mother may be of value then, I question whether she is actually needed so much as she is as "chum" to her growing daughter.

And it's not only girls who need "mothers as chums." I recall with pleasure an afternoon spent with a mother who spoke of being "chums" with her boy just growing into manhood. She was interested in his work and in his pleasures as well, and was looking forward to a little visit of a day or two which he managed to sandwich between trips as a girl looks forward to the visits of her sweetheart. So young did she keep herself with this companionship, that despite poor health, she was often taken for his sister when they were out together.

I recall with far less pleasure another mother who came to me to ask the most ordinary questions concerning her son's whereabouts on certain dates, because, knowing my friendliness with him she thought I'd know, and she did not have her son's confidence as to where he was going or with whom. I was able fortunately that time to tell her and satisfy her mother-heart, for he had been where she wanted he should be—in safe company. That mother kept a spotless house for her son to live in, she would get up splendid meals

for company to entertain him and his friends; she would stand for hours ironing her best table-cloth after entertaining until, weak, frail woman that she was, every nerve was atingle and muscles strained with the exertion. Yet she did not take time to become acquainted with her son. What wonder that he went wrong and his mother's heart was wrung with anguish when all too late? But was the fault all the son's? And sad it is that these cases are all too many.

I might say a word regarding the value of the mother as a "chum" to her husband, but doubtless I would be stopped, for I understand one can deal only on this platform with the things one really knows, and personally I've no experience along that line, but I've quantities of theory.

The relation of parent and child is a theme frequenty dilated upon by writers in these days. Ella Wheeler Wilcox recently, in speaking of the education of parents cites the case of Alexandra, mother of Herod's wife, who fearing a fate similar to her daughter's, rose and bitterly reproached her for a crime she knew she had not committed; so Herod's wife went to her death knowing her own mother was a traitor to her. She mentions this to show the evolution of motherhood since that day, and says: "Surely nowhere * * * could such a mother be found today. I have known mothers who were jealous of their daughters, I have seen many who were unkind in small ways and lacked sympathy. Thousands of mothers fail to win the confidence of their daughters." But she does not tell us why. Is it because the mother has not made a study of her daughter's nature and cannot understand its changes and proclivities? Is it because she has not been a "chum?"

Another writer charges a lack of love and duty on the part of the child, saying, "Many mothers have given youth, beauty, health and strength, and when lines of care mark their faces with wrinkles, and her hair is streaked with gray, how many are rewarded by the devotion and care of those for whom they have done so much? Not so many as there should be." This is a sad picture and true, yet I must say it does not appeal to me quite so much as some other phases. I trust I am not lacking in duty or devotion to parents, or in the family love which must bind families together in unity; and I may be taking the unpopular side when I say I fail to understand why so much talk of the duty of the child in the abstract toward a relation it had no voice or will in forming. Having thrust upon it the requirement of devotion and care in instances where there is little in nature to call it forth. So many writers speak of parents sacrificing everything for their children as tho' its very birth was a sacrifice for the child. Parenthood to my mind is *not* a sacrifice, it is a relation willingly assumed and entails upon it the duties of the parents because they *chose* it for more than it does upon the child who was ignorant of its coming.

This does not mean that the later care and tenderness given to the child should not receive in turn from the child all the care and devotion called forth by the parents in their relation as parents, but let it be a loving willingness and not a forced duty. Let the attitude of the parent be such as to absolutely force by loving propagation all the enlargement of the child's capacity for love—let it

fill, so far as possible, all the needs of the child nature through the actual giving of the parent itself and there will be in the majority of cases, no lack of the spontaneous giving of the child's full allegiance.

I recall how, years ago, the burden was lifted from my heart when, for the first time, I heard the last clause of the Biblical command, "Children obey your parents." From pulpit and from platform we hear this thundered forth, striking terror ofttimes to the child who feels the whole burden is his, but when softened by the latter clause of, "Fathers, provoke not your children to anger," and the duty is shown for the parents as well, the child feels relieved. So, all through, it seems to me, the duty is two-fold—the child shall give its obedience, but the commands of the parents are to be such as the child *can* obey!

Mother's Day, which has thrice been lovingly observed, has tendered many hearts and wakened many memories in the minds of the man of business, the scientist, the scholar with whose childish days the mother hovered as the beneficent factor. While fine as a memorial, it fails to take the place of the loving thought here and now—the caress, the deference, the devotion to one whose life was lived for her child.

The white carnation worn by loving, stalwart sons and matronly daughters savors of the esthetic and the beautiful, yet more beautiful still is the *action* toward those who have stood the storm and stress of a busy, helpful life. The beautiful tribute of flowers laid on a coffin-lid may testify of love, but better testimony is that of flowers given in life, the kiss of appreciation and love given while the eyes can brighten at the touch and the cheeks tinge with pleasure. Let those of us who have the mother here, who, being a true mother in all the term implies, deserves this honor, see to it that no lack on our part shall embitter the parting hour or the sad, lonely ones to follow.

Edgar Allen Poe, whose pen has enabled us to know and love for the aspirations he cherished but never realized:—and though his life held mistakes it held many beautiful things as well—drew us by an unmistakable cord when he called mother the "Name Incomparable," and said:

"In the heavens above
The angels whispering to one another,
Can find among their burning terms of love,
None so devotional as that of mother."

Just a parting word to the girls. A friend of mine laughingly questioned my ability to cope with this topic, saying: "You're not a mother, what do you know about it?" True, I'm not a mother, but I am, or have been a daughter. And I had a mother similar to the one portrayed by the first girl I mentioned. She left me a short time ago, the curtain of silence has fallen between her dwelling-place and mine, and the sweetest memories I have now are those wherein she was my confidant, my friend, my "chum" as well as mother. I loved her none the less because she took the place of

sister also. With her has gone so much of my own life. So many things occur continually I want to tell her as of old. And from my own experience let me say with Longfellow:

"Lead thy mother tenderly
Down life's steep decline;
Once her arm was thy support,
Now she leans on thine.
Thank God for thy mothers' love;
Guard the priceless boon;
For the bitter parting hour
Cometh all too soon."

And I know of no way to soften that parting hour like filling the present so full of sweet memories that the bitterness of duties unfulfilled can find no place there. Make sure you are to your mother *now* all she wants you to be, allowing her to be to you all her loving heart prompts as mother and as "chum." Won't you, please?

Recitations were well rendered by Masters Edward Schlicht and Andy Johnston.

The PRESIDENT: The next on the program is an address on "Domestic Science and High Cost of Living," by Miss Sara C. Lovejoy, Dean of Women and Head of the Department of Home Economics at Pennsylvania State College, State College, Pa.

Miss Lovejoy's address is as follows:

DOMESTIC SCIENCE AND THE HIGH COST OF LIVING.

By MISS SARA C. LOVEJOY, *State College, Pa.*

The subject of the high cost of living has been so thoroughly discussed in every newspaper and magazine in the country that there is no one here who can not give at least five assigned reasons for the present high prices. Daily papers, religious weeklies, monthly literary magazines, and all periodicals dealing with the farm and the home are vying with each other in explaining most fully the the causes and cures for existing conditions.

What are some of these? As given by different authorities, they are: Too much gold; too little gold; increased knowledge and pursuit of agriculture; decrease in agriculture, owing to other occupations, high tariff, low tariff, trusts—particularly the meat trust; lack of national control of natural resources; government interference with natural resources; increase in population; more luxurious way of living; lack of wisdom in the expenditure of money by the women. These and many more reasons are given, with a correspondingly large number of solutions for the difficulty.

I am not the person nor is this the place to weigh these and to try to find out more explanation. Most of us to-day are too vitally interested in our own homes and in the immediate effect of present conditions upon our own pocket books and households to care

to discuss broad national issues. Moreover, we need not confine ourselves to the cost of living in money only, for at this day with its complex demands, living costs much more than mere money. It costs too much in other expenditures—health, strength, comfort and even happiness. Shakespeare says in one of his plays: "Men die because they know not how to live." To meet our present conditions we might paraphrase this: "Women are dying before their time because they know not how to save time," or if they are not dying, they are ruining their dispositions, digestion, and often their domestic tranquility because they do not know how to keep house properly—how to conserve their natural resources of health and strength, as well as the acquired resources of money.

Some of you are doubtless saying: "Why talk about the causes of the high cost of living? What we want to know is the cure and how do you propose a remedy through the vague term, 'Domestic Science.'" To many people to-day this term suggests little because they suspect we are talking about a mere theory, something which is studied in colleges, which is perhaps being introduced into some public schools under the name of cooking, but which has no place in the practical affairs of the home. They tell us that "the people who talk about it have no homes of their own, and do not know what it means to wash and iron and bake; there is, therefore, no more value in Domestic Science than in a book of rules of what to do in case of drowning—when the book is in the house and we are in the water."

A few years ago men thought the same thing about agriculture. It was considered farming on paper with pen and ink as tools, instead of on the farm with plough and rake and hoe, but few to-day fail to recognize that the most successful farmers work with the head, as well as with the hands. The man who makes money out of his acres is the man who understands the structure of the soil, its possibilities and needs; and who is ready to meet modern conditions with modern methods. The man who makes money from his poultry or cattle studies the problem of feeding and housing these with the two-fold object of supplying best these needs and of doing it at the lowest cost. If he slights either of these objects, he may have some success, but he will not have the highest.

Now, Domestic Science, or as we call the broad term, "Home Economics," merely means to the home what agriculture means to the farm. It is a study of the problems and conditions of housekeeping in the twentieth century. It includes not merely the theory of what food elements the body needs and of how to supply these at the lowest cost, but also practice in marketing to secure the best food values and in actual cooking to get the best results from the food chosen. It includes not only the theory of the effect of certain chemicals as found in the various soaps, washing powders and blueings on fabrics, but the actual practice of washing; not merely the theory of suitability, artistic effects, and cost of various textiles for clothing, but practice in sewing and dressmaking; not merely the theory of planning the work of the household systematically but practice in housekeeping.

Is this not a study of as serious import as any in the world, for what other institution bears such a direct relation to the physical, mental and spiritual welfare of the human race as does the home?

Why is it, then, that we are content with managing our homes according to methods of fifty years ago? Why do many people still feel that any girl, by virtue of her sex, can manage a home successfully? It is as well to expect a boy, because his father is a physician and he runs in and out of his father's office many times a day, to understand the profession of medicine, as to expect a girl, just because she lives in a home and sits at the table three times a day, to understand without study and training, how to select and prepare the food that shall best furnish what the body needs for its complete development and maintenance, at the most reasonable cost, or to plan and carry on wisely the other work of the household.

Until we women realize that our business in life (for housekeeping is the business of seventeen millions out of the twenty-four millions of women in the United States), is as important as any other, and that it is, moreover, not drudgery but a profession, an art and a science, and until we undertake it intelligently, with the purpose of doing it, not merely *well enough,* but in the *best* possible way—that is, with the least expenditure of time, energy and money, and with the largest returns in the health, comfort and well-being of the family, we are failing to do our part of the world's work. One writer has said that the chief duty of a woman, as a citizen, is to be a good housekeeper and home-maker. This does not mean merely to be able to wash, bake and sweep so that we are clean and have enough to eat, with no strength or ambition left for anything else. It is, instead, doing these things well, as a means to our end, subordinating the material to the higher side of life. It means so regulating the household tasks that the mother may have time for something beside actual house work, time for reading, recreation and growth; time to train the children in the home. The poor woman who says she has no time to train her children because it takes all her energy to feed and clothe them is losing half her heritage and is depriving her children of their due.

Now what are some of the things our housekeepers need to know, in order to lessen this cost of living in time, health, money and happiness? The largest amount of money spent within the average home for any one item is for food; and the greatest amount of time spent within the household for any one task is for food. The reason for this is that we often mistake quantity for quality, variety for well-cooked food, high prices for nutritive value. Those who are interested in dairy husbandry find it necessary to spend time and thought in calculating the proper feed for their cattle, with a view to providing the necessary food elements at the lowest cost. In arranging a dietary the housekeeper has other matters to consider besides cost and nutrition. She must choose food that is also palatable, properly cooked, and suited to the age, occupation and condition of the people for whom she is providing.

The needs of the human body are not greatly different from those of other members of the animal kingdom. We must have materials to build up waste tissues, to supply the bones, and to furnish energy for bodily activities. Unless food fulfills all of these functions, the body pays the penalty. If we have not sufficient protein to repair the wear and tear of the body, we soon become inefficient and various ills assail us; if we omit mineral matter, bones and teeth suffer, and

if starches, sugars and fats are not consumed in large enough quantities, we have not the fuel with which to supply necessary activity. Moreover, if our diet is confined too exclusively of food supplying only one of these elements, no matter how much we consume, we are underfed, and are wasting money and energy. For instance, if we have a meal composed chiefly of bread of various kinds, of several of the proverbial Pennsylvania "spreads," and cake, we are supplying merely fuel, and presumably too much sugar. If, on the other hand, we have beef steak, eggs, lima beans, a glass of milk and custard pie, our meal is to heavy in protein.

Because most of us recognize lean meats as a source of the protein supply, we feel that the more meat we eat the better fed we are; and here lies one reason for the present high prices. While meat should form a part of the well-balanced dietary, it need not be eaten in such large quantities as it is. There are plenty of substitutes which will furnish the protein and, if properly cooked, are as palatable, digestible and much cheaper. Cheese which is usually regarded rather more as a condiment or relish than as a staple article of food, is rich in protein and can be cooked in numberless ways. Eggs, milk, nuts, cereals and legumes all furnish to the dietary what meat does and yet are rarely substituted for it. The following figures may help us to understand this better:

	Per cent. of protein.	Cost per 1,000 calories.
Beans (dried), ...	22.5	3 cents.
Sirloin steak, ...	16.5	25 cents.
Cheese, ...	25.9	8 cents.
Eggs, ...	13.	39 or 13 cents, (according to season of the year.)

That is, a dish of baked beans and pork will cost for the entire family, seven cents; steak for the same family will cost about seventy cents, and will contain less protein and little more fat. Moreover, beans and eggs do not cost, on the farm what they do at the town markets. In fact, in the winter time eggs are almost as valuable in the city as currency and for this reason many a farmer thinks it cheaper to sell his eggs and buy meat than to use them at home. This is, however, one of the economies where all sides of the question must be weighed.

Another way in which as housekeepers we are deceived is in regard to goods sold in retail packages. Here again we must weigh carefully the cost in money with the cost in ease of preparation or preference in taste. Rice is eight to ten cents a pound in bulk; puffed rice is twenty-seven cents a pound, and moreover, a pound of unprepared rice will, when cooked, be greater in bulk than the package of prepared rice. Cornmeal, which by the way is rich in fuel value, costs about two and a half cents a pound; corn flakes cost over fourteen cents a pound. In the case of both of these cereals it may be urged that the prepared variety saves work and fuel; moreover, we may prefer the taste of corn flakes to corn meal mush. All this is true, but it is the business of the housekeeper

to consider it and to decide which in her case is of more value—to save money or to save labor and fuel. It must be confessed that often it is wiser to do the latter, but let us be very sure that we know which we are doing and why we are doing it.

A further reason for the high cost of food is that we waste nutritive value by improper cooking and so expensive food materials are failing to supply the needs of the body. The best cut of steak or eggs fresh from the nest may be so spoiled by being overcooked, usually by frying that they injure rather than help the body. Moreover, a cheap cut of meat cooked slowly and thoroughly, as in a fireless cooker, is far more nutritive than an expensive steak fried rapidly until it is similar to leather in consistency.

The mention of the fireless cooker suggests another means of reducing the cost of living, if not in actual dollars, at least in expenditure of labor. When housekeepers learn that within the house as well as on the farm, it pays to spend money for new appliances to lighten and facilitate work, then we shall hear less about the drudgery of house work, and then will our farmers' wives have more time for other pursuits—for physical, mental and spiritual regeneration.

Again, as in the matter of food, we must consider our special needs. Perhaps what saves labor in one home may prove an extra burden in another. However, we all need some better facilities for work—running water in the house, bath rooms, cook-stoves and sinks conveniently placed and of the right height. We should put more study into the arrangement of the workshop of the home—the kitchen—so that every needed utensil may be so placed that we do not take two steps where one will do. In many a farm house we economize and sometimes go into debt in order to buy a heavy brussels carpet for the parlor or an elaborate piece of stuffed furniture—articles which will be harder to take care of than plainer furnishings. At the same time we leave our kitchens just as they were built forty years ago, with the stove several rods from the sink or kitchen table and with the pantry shelves another two rods away, and we are content to do our washing with as few facilities as it was done fifty years ago. Many a woman will insist upon having Nottingham lace curtains at her parlor windows and yet will feel that she cannot afford to have her windows and doors properly screened from those store-houses of filth and disease, the common house flies.

We are increasing the cost of living, then, by spending too little in our houses for what will add to the comfort of the family, to the ease of the housekeeper in performing her duties, and to the health of the household, as well as by spending too much money without wisdom.

One more great source of expense in our households is clothing. Here, however, we are justified in saying that we who live in the rural districts are less extravagant than are the dwellers in towns where the stores are often a constant temptation to the bargain-loving instincts of womankind. Nevertheless, wherever we live we have plenty of opportunities to be wise or foolish. We are sometimes deceived by the cheapness of a fabric into buying shoddy goods that wear out almost before they are made up. We buy five-

cent muslin instead of ten, regardless of the fact that it will shrink twice as much or that when the dressing is thoroughly washed out, it will be limp and sleazy. On the other hand, we pay an unreasonable price for a hat or suit because it is a fad, or is more elaborately trimmed than a plainer, more serviceable article. The textile industry is one that we, the consumers, must sooner or later regulate. Pure food laws are, to some extent, protecting our interests in regard to those supplies; pure textile laws must follow, to protect not our health, but our economic interests. Meantime it behooves us to consider more carefully whether we are getting the value of our money.

This leads us to the direct question of our expenditures. How much are we spending for all these necessities of life? How many housekeepers know how much the food, the clothing and the operating expenses of their households were last year? The definite statistics are much harder to estimate when we are living on a farm—and so do not pay in cash for all of our commodities, than when we are living on a stated salary in a town. Nevertheless it is the duty of every farmer and of every farmers' wife to have a systematic division of expenditures and to keep a cost account. No business man, no matter with how large a capital he is working, would keep on for a year unless he had accurate bookkeeping by which to account for every cent expended, and yet we in the home go on from year to year with a vague, general impression of how much we have and that most of it is spent. Before we can do much to settle the problem of the high cost of living we must put the management of our homes upon a business-like basis.

These, then, are some of the ways by which Domestic Science is to help the housekeeper solve her problems; by teaching her both how to cook and what to cook, by showing her the value of new methods of doing old tasks through modern labor-saving devices, by training her taste with regard to clothing and home furnishings that she may get the best value for her money and by helping her to regulate wisely the expenditures of all the resources of the household. Science, art, and economics are all included in a knowledge of housekeeping.

State College is the only institution of collegiate rank in this State where training in this branch of knowledge is given, although several technical schools do work in this line, and at this institution the course has been a twofold object to prepare girls to be intelligent, wise house wives, and to fit them for professional service either as teachers or dietitians. The demand for women thus trained both in scientific theories and in actual practice is greater than the supply. To this end our students work hard at their sciences, chemistry, bacteriology, physics, and also at the practical work of cooking, dietetics, washing, ironing, cleaning, sewing, dressmaking, millinery and all kinds of hand work. Economics both in its general phase of the production of wealth and in its application to the expenditures in the home is also included. The practical nature of this work is illustrated by the fact that the students are required to plan, cook and serve actual meals, the really elaborate ones costing twenty-five cents apiece for each person served; the less elaborate, furnishing all the necessary food elements, costing but twelve cents a day for the three meals.

Many a housekeeper of experience questions the possibility of such meals, but the students at State College can do this, and have the actual figures to prove it, since they are required to keep account of every cent spent and of the total nutritive value of each meal served.

One object in having this course at this, the Peoples' College of our State, is to train teachers, and this means that you who represent various communities and school boards must be the next to act. It is your province to see to it that these branches are introduced into your rural schools so that every girl may learn to keep house not merely from her mother, but from scientifically trained teachers who have made a study and application of the progress of science as it affects twentieth century housekeeping. In the kitchen as in the field we can learn much of practical, but in the schools as they should be to-day, we can learn more of both theory and practice. If the next generation of housekeepers is to be thoroughly efficient to cope with changing conditions, the girls of this generation must be taught systematically. Then we shall recognize that the cost of living is what we make it.

The PRESIDENT: We have heard about the high cost of living and how to cook. We are now going to have some music entitled "Cooks." Chorus by pupils of the eighth grade grammar school of this city, under the leadership of Mrs. Colbert.

After this entertainment was very creditably carried out Mrs. Marsh rendered two solos very acceptably.

The PRESIDENT: I am sure we could all listen to these splendid musical features for an hour.

The next number on the evening's program is an address on "Women's Share in Agriculture," by Miss Martha Van Rennselaer, of Ithaca, N. Y., for several years supervisor of Farmers' Wives Meetings and Lecturer in the Farmers' Institutes.

Miss Van Rensselaer's address was then delivered as follows:

WOMEN'S SHARE IN AGRICULTURE.

By MISS MARTHA VAN RENSSELAER, *Cornell University, Ithica, N. Y.*

(This lecture was illustrated with stereopticon.)

In prehistoric times men sought the woods for hunting and learned its language. Women learned to till the soil for food and learned her lessons from the nest builders and workers in clay.

Man's first desire was for food. He laid his game at the door of the woman and she learned to prepare it. She used the fruits and vegetables within her reach. She was the first farmer with a crude implement in her hand. She domesticated the cow and other animals to aid in her efforts for food. She built granaries and with crude implements ground the seed for bread and porridge. She cleared

the forests and learned the use of fire in preparing her fields for cultivation. She became as a beast of burden and transported her provisions to her dwelling and crude storehouses.

Agriculture in primitive days was beneath the dignity of men, but in the keeping of the herds they took the lead while to women was left the elements of agriculture. When the first lessons were learned and farming was a more developed industry, gradually the women confined their labors to the preparation of food and the men to the tilling of the soil. It became a means of keeping the family together and leading men to have a permanent abode.

In the progress of nations it was found that agriculture would pay a larger tribute than war and men turned to agriculture as it became more complex. Now he stands in the foreground in the agricultural world with woman at his side as a helper as in no other business. Woman as the original farmer was the forerunner of the housewife and the worker on the farm. She has not only aided her husband in the work and management of the farm, but has become an independent farmer. In 1870 there were in the United States 733,332 women laborers. Twenty years later there were 663,209. There was a larger increase in the same time among women who had charge of farms. In 1870 there were 22,681, in 1900, 307,706.

(Slides were introduced illustrating women at work in various lines of farming.)

In modern times men are being educated for farming. Only until recently has it been recognized that for the problems of the woman in her farm home an equal education is needed. We are paying more attention to the raw material than to the preparation of it for human nutrition. We are paying more attention to prevention of disease in animals than in humans. We are educating the boys for their real work in life and paying too little attention to the preparation of girls for living and helping others to live. We have not yet placed an economic value on a woman's time and labor.

The teaching of Domestic Science must become an inevitable accomplishment of the teaching of Agriculture in rural districts. Farmers' Institutes have been provided for years under state enactment. The women on the farms have gone with the men to these institutes, listened to discussions upon rations for cattle, rotation of crops, and best methods for improving breeds of plants and animals. Women as well as men have learned to think in terms of protein, carbohydrate and fat. They understand bacterial action in the soil and in the cultures from cream; they have learned the life history of aphids and the San José scale; they have studied the laws governing the breeding of plants and animals. What other class of women than farmers' wives is more nearly ready to study intelligently rations for men, the health of the household as determined by knowledge of infection, the water supply and disposal of waste, and the conditions for a stronger race of men? All of these questions and many more come to the farm women more than to other women.

Improvements in farm machinery and equipment have arrived before household improvements. Men and women have together economized to buy more acres, more stock and more farm imple-

ments. The household side has been forgotten and women have learned how not to spend money instead of how to contrive to make the kitchen a workshop run on truly economic principles. The experience and mechanical skill of men are needed to make healthful and convenient houses. Their business ability is needed to discover that a woman's time and strength are capital whether she is paid a wage or not.

Traditions and present conditions do not square up. Old ideals must be given up. The activities and interests of women are extending. Woman's education must be accommodated to our present needs. The education of girls now has a double aspect. She is a homemaker in the old sense and is widely becoming an industrial worker.

There is more and more need that women know the household arts. Women need to learn what to eliminate from the home, and determine whether they are doing there what could be done better elsewhere. Otherwise there is useless labor. Woman is becoming an industrial worker alongside of her brother and husband. A great amount of work is given to the factory which was once done in the home. There is smaller chance therefore for an income to-day in the home. Neither man nor woman can compete with the machine. If women enter men's work shorter hours for all must result, otherwise there are lower standards. At the same time there is danger of neglect of work properly given to women for the nurishment and care of her family. The problem still confronting her is whether the food is properly cooked and served with sufficient variety and proper selection, whether there are healthful sanitary conditions for the proper efficiency of the family and the problems of household construction, decoration and furnishing. For these she needs training.

Every rural community has its group of young women asking what is in store for them and its group of older women asking how with scarcity of help they can accomplish all their tasks. Some of the young women are stirred to aspirations for teaching, stenography or factory life where they can get away from the humdrum and monotony of household routine. Others are fascinated by the opportunities of farming for women and others are staying at home because they are needed or have married their 'steady job.' These women have done much for the farming of the present and the future. They are executive. They have economized and they have listened attentively to ways and means of improving farm conditions. Farming in the meantime has been 'looking up.' Women are still executive, economical, striving for gain in the farm finances for the sake of more land and education for the children. Standards of living have been rising and the farm home has come to be regarded as a place where better conditions should prevail for the sake of the children and for the sake of the entire community whom the farmer feeds.

Men are asking that the youth be trained for farming and are trying to induce the young man to stay on the farm. They are asking for better and more permanent forms of agriculture that the people may be better and more cheaply fed. Training the farmer

for his task is only half the problem. The woman on the farm is a vital part of the success of the place. The farm rises no higher than its women.

Women need education for their task as much as men. Men have long thought the 'rule of thumb' was good enough for the work in the house and the care of the family although they believed that scientific accuracy was needed for tilling and feeding out of doors.

Women need the inspiration and uplook of intelligent service, of scientific methods, of artistic accomplishment in even very practical affairs.

Much is said about the improvement of the raw material. What is the use of it all if women are not trained for the selection and preparation of the raw material?

Housekeeping is behind the times. The house has the poorest workshop of any industry in existence. Here is needed the co-operation of men. The same masculine inventive genius which brought water to the barn is needed to bring it to the house; to attach the same power to the washing machine which is used on his saw or threshing machine. Men have carried a certain business calculation into their farming which prevents their using worn-out, out-of-date tools and equipment; the same business thrift should prevent unhandy conditions in the kitchen, and lack of labor saving devices. Farmers do not want their sons to work in the way they and their fathers worked. Neither can they afford to allow their wives and daughters to work under such disadvantages as the old-time kitchen presented.

Millions of dollars are spent in the United States every year for domestic service. This includes large amounts not only for wages but for waste and for food. Until this amount is safeguarded by training and intelligence, wasted effort and wasted material contribute to the high cost of living.

We recognize the fact that the men who are working in the institutes are doing a splendid work in teaching the adult people of the country. In your institutes there are young men and young women needing inspiration, direction, incentive. We want more intelligent men and women in the homes. Better conditions will prevail to prevent women from feeling that they are machines, goods or chattels; they must believe they are a part of the economy of the household and a progressive part. Institutes should help girls to feel that they should have an exalted attitude towards housework and their positions as wives and mothers.

If a man or woman went out to institutes this year and feels that he inspired his neighbors for higher ideals and for better conditions he has done more than to earn his salary.

The PRESIDENT: This completes the program of the Women's session.

The Institute stands adjourned until tomorrow morning at 9.00 o'clock.

Friday Morning, May 27, 1910.

Mr. M. P. Shoemaker in the Chair.

The CHAIRMAN: It is past the hour for this morning's session to begin. If Mr. Foust is not here, we will take up the second topic, entitled: "Some Things Outside the Farmyard Gate," by Mr. Fred W. Card, of Sylvania, Pa., one of our Institute Lecturers.

Mr. Card then delivered his address as follows:

SOME THINGS OUTSIDE THE FARMYARD GATE.

By FRED W. CARD, *Sylvania, Pa.*

All Institute Lecturers realize, yet are sometimes prone to forget, that the production of crops and the making of money is not all there is of farming. These, while important, represent only one phase of successful agriculture. Most of us agree, therefore, that some things aside from these ought to be discussed on the institute platform. For this reason I have been taking up in one of my topics some things which come to the farmer as a duty. Some of these duties come to him as a farmer in his relationship to other farmers; some of them come to him as a citizen in his relationship to his fellow-men. He has no right to shirk these duties. Their number is great. I shall mention but a few of them.

First, though not most important, it is his duty to interest himself in the subject of farmers' organizations. These are of various classes but I will mention first co-operative organizations. These may take different forms; first, that of co-operative production, representing in many phases, from the simple ownership of an implement or a sire by two neighbors to the co-operative company which owns a creamery or a canning factory. The result of these organizations has not always been satisfactory, sometimes due to one cause, sometimes to another; but often, in the case of creameries and canning factories, the plant has been established at the solicitation of a promoter concerned not with the success of the undertaking but with securing the greatest possible price for the equipment furnished. At other times failure has resulted through the lack of good business management. When established on a proper financial basis, with men of good business sense in control, the results have usually been good.

A second form of co-operative organizations is represented by co-operative selling, best illustrated perhaps by the first-shipping associations of the far West. This form of organization is less important to us in the Eastern states owing to our closer proximity to markets and the better opportunities offered for individual sales. Yet this brings us face to face with the great problem of distribution, one which has called for more attention than it has yet received

*Hon. James Foust, Dairy and Food Commissioner of the Commonwealth of Pennsylvania, was to have delivered the first address of the morning on the subject of "Difficulties Encountered In Enforcing The Pure Food Laws," but was prevented by press of official duties from attending the Institute.

from farmers and those interested in agricultural welfare. One of our leading agricultural journals has for some time been discussing this matter and has arrived at the conclusion that under average conditions the farmer receives about 35 cents out of the dollar which the consumer pays for his products, the remainder going to the carrier and the handler. Recently President Yoakum, of the Frisco Lines, in discussing these problems, has cited some definite instances which serve well as illustrations. He says that the Florida truck grower receives $2.25 for a crate of beans; the railroad receives 50 cents for the 800 mile haul to the New York market; the dealers receive $3.65 and the consumer pays $6.40. In other words 35 per cent of this price goes to the grower, 8 per cent. to the railroad and 57 per cent. to the dealer. Is this distribution equitable? During the last winter eggs have sold in Arkansas and Missouri for 15 cents a dozen; freight to New York is 2 cents a dozen. The consumer pays 30 cents for the eggs and the dealer receives 13 cents of that amount. The rice farmer of the Gulf states receives $2\frac{1}{2}$ cents a pound for his rice; the railroad receives $\frac{1}{2}$ cent for the haul to New York; the dealer receives 7 cents a pound for handling and the consumer pays 10 cents a pound. These may be exceptional illustrations, yet they represent in a general way conditions as they exist. The middleman is a necessary part of modern business; he cannot be eliminated, yet the problem of a more equitable distribution of returns needs study and solution.

A third form of co-operative organization is represented by co-operative buying. Any grange, fruit-growers' association or other organization, by working together, can save its members considerable money by buying fertilizers, seeds, spraying materials and similar supplies together. I know of one grange in a potato-growing region which for years has bought its seed potatoes from Maine by the car load and had its fertilizers mixed according to its own formula by the fertilizer firm which would give the best bid with a sufficient guarantee of the product.

The most prominent farmers' organization at the present day is the Grange. Its aims and purposes are too well known to need discussion. We are likely to forget the good which it has accomplished for farming interests, yet its possibilities lie far in advance of what it has already done.

It is the duty of the farmer to interest himself in questions of public policy, questions which may influence him chiefly or which may influence other members of the community equally. First among these I will mention good roads. This is a question of paramount importance to the farmer, despite the problem of the automobile which is now undergoing solution. The farm which has between it and the market a hill with a grade of 8 to 10 feet in the hundred, or a piece of swampy road which may be nearly impasable at seasons of the year, is worth many per cent. less than a farm of equal productiveness more favorably situated. The weight of load which can be hauled is determined by the steepest or poorest point in that road, not by its average condition. What the solution of this road problem should be I am not wise enough to say. I am not at all sure that the most promising line is in seeking appropriations for disconnected patches of State road here and there, built at excessive cost, for the accommodation of certain communities and certain

legislators who wish to please their constituents. I believe that this problem needs careful, systematic study by men trained for that purpose, men who should be able to devise methods of building country roads at reasonable cost which, while not equal to the macadamized roads, shall greatly improve our present ones. The bad location of many of our roads is one of their worst features, yet even this could often be changed at far less expense than the making of State roads. Thorough drainage alone would do much to solve this problem.

Not all communities need to interest themselves especially in the problem of the rural telephone, yet I find many localities in the State which are not yet served as they should be in this respect. Unfortunately it is not easy to establish an independent line where corporation lines already are in the field, but undoubtedly this is the method which will give best returns for the farmers' money. As an illustration, let me mention the company in our own locality. I well remember when this movement was started. Small in its beginning working to us from the westward, farmers were allowed to furnish poles or work in part payment for their stock and no man was allowed to own more than three shares of stock, thereby guarding against monopoly. At the present time this company is represented by nearly 1,200 stockholders, with half as many renters, and owns about 2,000 miles of wire. There is scarcely a farm in the region but can be reached by 'phone. The expense at the present time, to stockholders owning their own 'phones, is $4.00 a year, an increase of $1.00 over previous years. The benefits can only be realized by those who enjoy them.

Freight-carrying trolleys are badly needed throughout many of our farming communities. Unfortunately these come most rapidly in most densely populated localities. These must be largely the result of growth and time, but any action favoring the establishment of such lines should be considered the duty of every farmer.

The means of communication of greatest importance to the farmer at the present time would be obtained by the establishment of the parcels post. Any farmer who wishes to reach a distant customer with a pail of butter or case of eggs knows that 25 cents is the least possible express charge, with rates rapidly increasing with distance or transfer from one company to another. The German farmer may send a 10-lb. pail of butter anywhere within a distance of 46 miles or less for 6 cents, or anywhere within the limits of Germany and Austria for 12 cents.

Several years ago a gentleman presented a suit case at the post office window in New York City, stating that he wished to mail it to New Haven. He was soon troubled to find that he must tell the contents of the case, although he could not see why that made any difference in the cost of its carriage. If it contained magazines he must further tell the postal clerk his business, for if he were a private individual sending those magazines to another private individual he should pay 4 cents a pound. If he were a printer sending them to a publisher he should pay 8 cents a pound. If he were a publisher sending them to the newsdealer he might send them for 1 cent a pound. If they chanced to have a board cover on them, making them a book, he must pay 8 cents a pound. If he chanced

to be a farmer and had in that suit case potatoes or corn he must tell what he intended to do with them. If he meant to plant these things he might send them for 8 cents a pound but if he intended to eat them he must pay 16 cents a pound. Furthermore, he must give up the key to the government. He did not realize that is was the purpose of the postal authorities to act as detectives where no intent of misdemeanor was apparent. Upon inquiry he found that he might send this suit case to New Zealand and back to New Haven for $2.64 or by way of Germany for $1.95; but he did not care to wait that long so decided to mail it direct. However, it exceeded 4 pounds in weight, therefore he could send it at none of these rates but must pay letter postage. It was mailed at 5.30 p. m., and delivered at 10.47 p. m., at a cost of $3.68. It could have been mailed from any point in Germany to the same destination for 63 cents or to any point within Germany, as above stated for 12 cents.

The express companies are ready to interpose objections, voiced by Congressmen, to the establishment of parcels post. They say that our country is too big; we cannot do what the smaller countries of Europe can do. If so, why not limit the distance as in Germany, with a higher rate for the greater distance. They point to our present postal deficit and say we cannot afford to increase this deficit. Some light is shown upon this problem by the report of the Canadian Postal Department for the year ending March 31, 1909. During that year the mail carrying mileage of Canada increased over 1,000,000 miles, entailing an additional cost of nearly $600,000. During the same year the drop letter rate in cities having carrier service was reduced from 2 cents to 1 cent and the postal rate on bi-weekly and monthly publications placed at a uniform rate of ½ cent a pound, just one-fourth what is paid in our country, yet the Canadian Postal Department showed a surplus of nearly $1,000,000 for that year.

A recent writer states that he had been an assistant postmaster in Wisconsin for nearly 27 years, under five postmasters, and that with a single exception, and that for only a short time, not one of these postmasters ever had so much as a chair or desk in the office or ever knew anything about its management; that the work was done by paying an assistant postmaster one-half the salary received by the postmaster. Why not cut out these sinecure postmasterships and help reduce that deficit? Then put the weighing and payment to railroads on an equitable basis; in short, put good business methods into our postal management, and this deficit would soon disappear. There are some 40,000 rural delivery wagons traveling the roads of our country, each one carrying less than one-fourth of a load. Give us the parcels post and these carriers something to haul and the postal deficit will look out for itself.

It is argued that the country merchant opposes the parcels post on the ground that he cannot then compete with the great mail order houses of the cities. Last year I grew a few potatoes on a dry hillside among young trees. No rain fell and the plants stood still. At harvest time the potatoes were few and small. The cost was high. If I took them to our country store-keeper and tell him these conditions, saying that I can not compete in price with the grower

who found conditions more favorable and that he should pay me $1.00 per bushel instead of 30 cents or 40 cents which he may be paying, what will his answer be? If he tells me that he cannot buy and sell merchandise as cheaply as a man 500 miles away in a distant state with excessive rents and clerk hire to pay, what answer have I a right to give? But I believe this objection is groundless. It often happens that for the need of some small article which cannot be had at the country store, or upon which the price asked is excessive, the farmer makes up an order of sufficient size to warrant a freight shipment, sending it to a mail order house, when if he could have had the one article sent at reasonable cost by parcels post he would have limited his order to that and bought the rest from the home store. Just so long as we permit corporate interests to dominate this question just so long will we do without this needed reform. It is time that we speak in no uncertain language and demand this right.

Few of us feel that we know much about the tariff, and sometimes we wonder, when we think of the recent debate on this subject in Congress, whether any one knows much about it. If we have arrived at any conclusion I think it has been that this matter ought no longer to be the football of party politics or the grab bag of private interests; that it ought to be removed entirely from political manipulation and turned over to a commission of men trained by study and experience to arrive at just and equitable conclusions. In other words, that there ought to be a tariff commission which should settle the question of duties upon imported goods.

Many questions of minor importance along these lines are worthy of consideration, among which may be mentioned that of land tenure. There is no reason for our present cumbersome, expensive and uncertain system of land transfer. The Torrens system would do away with all this, making the transfer of land safe and simple.

Another question of prime import upon which each one of us should make our views and influence felt is that of economy and integrity in public administration. There is no good reason why one system of business management or one system of morals should prevail in private affairs and another system in public affairs. There has been and still is too much laxity in this matter. We need to demand better service from public men and better business methods in the management of public affairs. Closely interwoven with this is the whole subject of taxation and the problem of its equitable adjustment.

Another grave problem which interests every farmer is that of the general status of agriculture in America. What is to be the future of the American farmer? Essentially he has been in the past a middle-class man, a balance wheel for the nation. Farmers there are, to besure, who fall far below this estimate but as a class this is where we expect to find him. Shall he continue to occupy this position? The history of many of the older countries of the world does not afford a promising outlook. Too often has the tiller of the soil sunk to the level of a tenant or even to that of the peasant. A problem of this sort is not to be solved by any offhand remedy or suggestion. It is one which will demand time and study, but one which is worthy of the best thought of the men and women who have at heart the welfare of American agriculture.

No farmer can afford to neglect the social life of the community. Too often he does neglect it and suffers the result. Man is a social being. He demands more than food and drink. Social intercourse contributes both to enjoyment and to business success. Country life does not favor it. It therefore comes upon us as a duty to give some thought to this phase of life.

Every man, whether farmer, mechanic, merchant or lawyer, owes a duty to the public school. This duty unfortunately most of us shirk. But the problem of the rural school is facing us today in such a way that we cannot afford to neglect it. We are proud of the men and women engaged in educational work, and prouder yet of the pupils within these schools; yet we have the right to ask whether our school system has done in the past what it ought to do for the country child. I think our answer must be that while it has done much it might have done more. Long have we bewailed the movement from country to city, yet what can we expect when all the work of the school points only in that direction. I am not among those who expect much in the teaching of agriculture in the common schools which will enable the boy to become a better farmer or in the teaching of domestic science which shall enable the girl to become a better housewife, but I believe we have the right to ask of these schools that they shall help us to maintain in the mind of the child an interest in the affairs of the farm and home. We need a type of education more closely in touch with the future life work of the child. It matters less whether that instruction be of the highest type possible than it does that it shall be of some type which shall show to the child the possibilities along these lines. Mistakes will be made as mistakes have been made in the past. Educators, in their zeal for agricultural, industrial and domestic education, will be prone to introduce into the school many things which could be better taught in the home and on the farm. We shall need to exercise an oversight and bring our judgment to bear in these problems. There is no lack of opportunity for usefulness for the educated farmer and farmer's wife in connection with this public problem.

So, too, it is the duty of every man to lend his aid to the church. I care not whether you are a member of this or that church or indeed of any church, you cannot afford to neglect the things for which the church as a whole stands for. Sweep from our present civilization the things which have been the outgrowth directly and indirectly of church life and activity and little would be left which makes life best worth living. Unquestionably the country church has had in recent years a hard struggle. It has lost some of its oldtime influence. It faces the need of a readjustment in its methods and obligations. It needs the help of every earnest man and woman within the sphere of its influence. I believe the church should be in closer touch with the affairs of the community in which it is located; in other words, with the farmer and the home. I count it a most encouraging sign of recent times that one of our agricultural colleges has established a summer school for the teaching of agriculture to ministers. I shall not be surprised to see in the near future the establishment of agricultural courses in our theological seminaries, for I believe that the minister who is to render the

greatest service and be of most help to his people in the country community is to be a man who understands agriculture and knows the problems and perplexities of the farmer and the farmer's home. There is greater need that the country church should be a social center for the community than in the case of the city church. Institutional churches have been established in cities in which libraries, game rooms, gymnasiums and similar facilities exist. There is greater need for those things in connection with the country church, though the problem of securing them is far more difficult. I wish the day might come when every country community could possess such a church. Personally I would have in that church some things which perhaps might shock the sensibilities of some good people but which nevertheless I believe would contribute to the moral and spiritual welfare of the young people of the community.

Thus far I have dwelt entirely upon the duties facing the American farmer, but there come to him privileges as well, though, as I look these over it seems to me that most of them lie within the farmyard gate rather than without it. There is no bar to the passage of good literature and good books of all sorts through this gateway. The cost is little and every farm home has open to it boundless possibilities along this line, the companionship of the noblest men and women which the world has produced, at their best moments. Music, perhaps not of the most fashionable or approved type, but music which shall enliven and upbuild human life may be found therein. Art, too, may find its place there. Good pictures are not expensive. Better yet, there lies spread before the farmhouse window landscape pictures unequalled by any artist's brush, pictures changing from day to day from month to month, pictures which shall bring rest and inspiration to all who will stop to look and drink in their beauty. Nature in all its manifestations is before the farmer and his family at every turn. Let him pause to read her message and listen to her language. In the evolution of plants and animals going on before his eyes may be seen a glimpse of creation taking place at a far more rapid pace than in any wild plants and animals. Then, too, comes the inspiring thought that some measure of this creation is being given over into his own hands in the shaping and developing of these forms and types. Here he may catch whispers of the Divine Voice or read a message of Divine Revelation given to man today in a language ever fresh and ever new.

Let no farmer shirk these duties nor become so absorbed in his pursuit of dollars that he fails to avail himself of these privileges.

PROF. MENGES: Let me ask you a question for information. Isn't it a fact that the United States Mail carries the express packages sent from New York to San Francisco instead of the express companies, and the express companies carry the express packages that are sent for the shorter distances? Is that a fact?

MR. CARD: I think that is true. I am not positive. It is said that the government pays an average of 9 cents a pound for hauling this mail matter. Now from New York to Chicago is probably more than an average haul. They would carry a passenger that same distance and give him an upholstered seat for about that same sum, and the mail matter can be dumped into the baggage car.

The CHAIRMAN: Any further discussion on this topic? It not, we will take up the next number on the program, "How to Raise Crops Without Weeds," by Dr. J. D. Detrich.

HOW TO RAISE CROPS WITHOUT WEEDS.

By DR. J. D. DETRICH, *Scranton, Pa.*

The first to grow on a farm and the last to talk about on a program at an agricultural Institute are weeds. Admitting with all fellow-farmers, that weeds are universal nuisances, yea, robbers of plant food and heavy drinkers of film water, depriving growing crops of both, necessitates a greater need for their suppression if not entire eradication in farm practice. To say that land can be put into such a high state of fertility that weeds will not grow is a wrong conception of soil and its nature. Yet without every inch of soil is tillable and in a loose friable condition, also in position for the operation of modern farm implements and machines to cut, plow and stir the top soil, weeds will occupy the poorer as well as the best land. Fences on farms are great weed harbors for their growth, ripening and propagation, since the plow, mowing machines or cultivator are prevented from destroying them owing to the fence being in the way. Trees, rocks, stone piles and stumps in fields alike obstruct implements and machines from putting a stop to weeds.

The edges of ponds, the banks of streams and open ditches likewise grow and mature weeds that reseed the land about them with their baneful influence. A farm free from as many of these favorable places for weeds to grow unmolested, is a part of farm management that can not afford to be overlooked, but strictly enforced season after season till all weed harbors are destroyed or brought under control.

Perhaps this whole subject of growing crops without weeds can in no way be made more intelligible than to cite an illustration where a farm was actually carried on and noted for its scarcity of weeds and at the same time remarkable for its fertility. The weed problem on this farm was satisfactorily solved by pure seed, thorough tillage, frequent cropping of maximum yields, thick seeding never allowing weeds to seed by clipping with a mower when in bloom and the manuring of every principal crop with fresh stable manure.

Weeds were plenty on this farm before the radical changes in management and new methods were introduced. The first departure was to discontinue the old plan of a long rotation and instead of manuring once in four or five years with barnyard manure of doubtful value, to haul fresh stable manure of known worth and top dress grass itself. Along with this was practiced new methods of seeding certain crops; grass being one of these. To sow timothy with wheat at seeding and then add clover to the crop by sowing it on the wheat field in the following spring some time when the "sign

was right," was wholly adandoned for the mixture of grass, such as clover, timothy, red top and alsike seeding these in the month of August at one sowing without a reverse crop of any kind. The reason for this change, if for no other, yet there are others, most weighty, was due to the following: If timothy is sown with wheat, the timothy seed runs into the same furrow or drill with the wheat. The hoes on a grain drill are never less than six inches apart, thus having a space six inches wide for weeds to grow and only a string-like groove for the wheat and timothy stalks. If clover is sown in the spring on this hard and weather beaten grain field depending on cracks for tillage there is much of it, if not all settles in the same grooves already occupied by the timothy and wheat so that the six inch space for weeds has not been encroached upon very much by the clover. When the wheat begins to grow also the clover and timothy in the spring, the weeds have full six inches of room on which to flourish and they do; they get an excellent start and keep it. Many of them are just high enough when the wheat is cut to miss the sickle of the machine. If they are not in bloom and many of them are not, if clipped, start afresh and grow with more vigor than ever. But many fall weeds ripen about the same time as the wheat such as garlic, cockle and other weeds harvested, stored and threshed with the grain. These if ground with the wheat into flour either discolor or give a very unpleasant taste to bread, and if they escape grinding are returned to the land per the manure or otherwise only to infest the field again.

It is very clear from what is only too common in experience that the old style of seeding grass with a reverse crop is a very fruitful source of weeds. Nor does the evil they affect on the wheat crop cease with it, but a still more serious result follows their presence in the hay crop that succeeds the wheat harvest. Nowhere do weeds appear in greater abundance, more varieties and more objectional than in the feeding value of hay. Their rank growth, towering height and woody stalks do not only appear above the timothy and clover but smother the growth of the valuable grasses and injure the feeding value of the roughage. Many weeds ripen their seeds before the timothy and clover are in bloom either to reseed the field, or are cut with the grass, cured with the hay and hauled to the barn stored away safely in the mows, to go through the live-stock when fed like gun shot undigested, pass into the manure pile to reseed the land when the manure is spread on the fields. After hay hauling is finished and the barn floor swept, it is surprising to see the sorrel, plaintain, dock and other weed seeds that have shattered in handling the hay. As long as such seeding is practiced on any farm land, rich or poor, weeds will increase instead of diminish, for no more effectual plan for perpetuating weeds could be devised.

The new plan adopted to obviate the propagation of weeds was to start preparing the land for grass about 18 months beforehand by turning a timothy sod free of weeds, well top-dressed, the previous fall or two years before the grass seeding with the best and cleanest fresh stable manure for a crop of ensilage corn.

The plowing of the sod carefully and well done turning up side down every furrow 12 inches wide—rolling followed, plowing never again, till the field was plowed for another crop. Harrowing began

after rolling, using 3 different harrows to put the soil in the best condition at the least labor and cost. The field marked out so the corn would be in a furrow below the surface of the field when it first comes up. The third day after planting the weeder was run over the field, the fifth day the corn would be up, strong and bright, when it made its second or third leaf the weeder was put on again, but if it had rained and a crust was on the field too hard for the weeder to do any execution, the one-horse cultivator was spread just wide enough to go once between the rows of corn without attempting to mark or get close to the little stalks. The horse walked in the middle between the rows and the wheel of the cultivator followed in the horse's footprints. This plan broke the crust and left a fine mellow soil to be worked over into the corn rows without covering the plants but filling the groove or trough in which the corn was planted, covering the small weeds and killing millions not yet born. The next work the corn received was with the riding cultivator, going close to the corn followed in a day or two by the weeder and not a growing weed to be seen. The crop having arrived at this stage there was no trouble to salivate the weeds during the season by the dust mulch well stirred while growing to retain soil moisture.

When the crop was ready for the silo there were no weeds. The silo filled and the field clean the two-horse cultivator works up the corn stalk ground for seeding to rye as a cover crop to be turned by the plow in the early spring for oats and peas. This last named crop is the finest soil cleaner save that of buckwheat for freeing the land of weeds and is splendid to preceed the laying down of a field to grass in August.

To anyone interested in this method he is invited to observe the manner of preparation. First the timothy sod manured and prepared for corn; the surface of the corn field worked all summer, then hoe harrowed for seeding rye, plowed in the spring for oats and peas. Thus the land has had two plowings and one whole summer's surface work also prepared for the rye seeding by the cultivator, all this looking forward to a *clean grass* field, free from weeds by tillage together with the crop of peas and oats that in its dense growth will smother any weed that attempts to grow. The peas and oats stubble is then manured daily with fresh stable manure; this finished, the plow is set to cut deeper than for any other crop on the farm, rolled once and harrowed till the soil splashes when the feet of the team strike its surface in working. By this time there is a seed bed from 3½ to 4 inches deep in fineness like dust, then a mixture of red clover, alsike timothy and red top is sown broadcast with a wheelbarrow seeder or any of the devices for the purpose and brushed in with the weeder, going over the field but once and only in one direction. The field is left in this condition till the next June when the mower cuts the crop for hay. After the first crop a second is cut, then a third, and very often a fourth, finishing making hay in October. Immediately fresh, wet, heavy stable manure mixed with short litter is spread daily over the sod till the piece of land is completely covered and left till the following June, when the growing timothy is without a weed, little or big standing, as thick as it can grow.

Having followed this plan of lessening if not entirely exterminating weeds by growing crops with the object in view of eradicating them by obtaining the largest crops and profits with no loss to the pocketbook. The method is extremely simple, raise as many and as heavy crops as possible to choke out the weeds, smother them, kick them out with the weeder, turn them under with the plow, cover them over with the cultivator, never let them go to seed, have no harboring places for them to propagate, never haul their seed in the manure to the field, and at the same time sow the best seed, remembering also the injunction "that he that soweth sparingly shall reap also sparingly." The whole subject of growing crops without weeds resolves itself into one conclusion, that of intensive farming must be caried out to the letter. No nostrums about it, only thoroughness in every department of crop growing.

MISS BAKER: I would like Dr. Detrich to give us the formula for the grass seeding.

DR. DETRICH: Six quarts of red clover; five quarts of timothy; two and a half pounds of alsike and one pound of red top; sow on the 20th of August, after fitting your field in a rolling dust mulch from two and a half to three inches deep; sow this on top with any broadcasting machine and brush it in with the weeder once and don't roll the field afterwards. Never roll the field but once and that is right after plowing.

A Member: You sow the clover seed in August?

DR. DETRICH: Yes; this whole mixture, put it in a box and mixed thoroughly and sowed altogether at that rate per acre and brush in with the weeder. Then when you get your first crop out with the mowing machine. If not enough to make a second crop we will clip anyhow and let lay on the field and this is a wonderful mulch for the winter; and if you can clip it twice, do so. Some few weeds will come along with the first seeding but the frost will nip everyone of them.

A Member: How would you handle this where you don't cut off the corn, where you are up 2,000 feet, up until the 25th of August, the 21st of September?

DR. DETRICH: I am speaking of the 40° of latitude. If you were up that high it would be a difficult thing to sow in August and get the ground right.

MR. GOODERHAM: I have had good results with rye or wheat but not with oats.

DR. DETRICH: That is because your latitude is changed. I think every farmer should know the altitude of his farm above sea level; he should know to the very fraction what it is.

A Member: Did I understand this seeding is for a two years crop only.

DR. DETRICH: Yes sir. The reason I sow down these four seeds for a crop is this: I am always watching the soil. The red clover is the longer of the two, the alsike next. These clover roots are underground harrows. You cannot get soil machines to put the soil into the same condition like these roots will do it. Then the first year these clover roots have done their work. They leave the holes in the ground and let water and air into the soil. The next year comes the timothy and red top roots, close rooters, right on the top. Mulch thoroughly and plow the sod the next spring. There is no machine in the world that can put the soil in the condition those little roots do. You want your soil in condition that things can grow and that is the reason I use these four kinds of grass seed. I want to have the work done by the roots, and they will furnish the humus, the water tubes and air tubes and it would be a very foolish man who would let that lay another year when they put it in that condition. You would tighten up that soil and keep out the air and water. You must keep nature at work, have circulation of air and water in the soil and you will never have trouble. You will be killing the enemies of the soil, the bugs and enemies of all kinds, and there will be no trouble with crops. I never let the old sod lay and have the farm become foul to destroy the crops. Keep your farm clean with plow and machine; keep it clean with seed; keep every particle of your farm in the very best condition. There is nothing in the world will bring it into better condition than under those circumtsances. I can keep a farm without any weeds by giving this attention.

A Member: In what proportion do you sow your ground with oats and peas?

DR. DETRICH: I sow thicker than the gentleman recommended here. I sow 54 quarts of Canada field peas and 54 quarts of oats. I put the oats in from a half an inch to an inch and the peas I put in from three to four inches. You can hardly get a drill that will put them down four inches.

A Member: You sow them separately?

DR. DETRICH: Yes sir. You sow the peas one way and the oats another way. The people fail because they don't do it right. If you don't follow the instructions of those who have been successful you will go wrong and if you follow instructions in detail you are very seldom disappointed.

A Member: You prefer to allow your grass to lay two years rather than one?

DR. DETRICH: You could not coax me to plow a field in one year. You want to get the benefit of your work of the previous years. Your soil is not in shape for it. I want not less than six tons of hay to the acre and a man ought to have eight.

A Member: What month do you sow in?

DR. DETRICH: I sow in August in the 40° of latitude.

A Member: Do you use any grain?

DR. DETRICH: I never use a nurse crop.

A Member; You sow alone?

DR. DETRICH: Just alone to put the ground into the best condition.

A Member: Does winter have any effect upon the clover?

DR. DETRICH: No, not if you put it in at the time I told you; but if put in two weeks later I guarantee it will kill it. That is the reason we fix the 20th of August, in order that you do get clover. You are a little further north than I am and so you ought to put it in on the 12th of August, or, if you are up higher in the air, it would be better for you to put it in earlier.

A Member: In regard to leaving grass sod lay for two years, you don't refer to alfalfa?

DR. DETRICH: No; just to the mixture I gave you. Alfalfa is a legume, a different thing.

PROF. STEWART: What do you say about putting cattle on the grass.

DR. DETRICH: It takes a rich man who will pasture cattle. This is my doctrine of it. You are going to get your farms poor if you pasture. There is no man with the opportunities we have to-day that can afford to pasture a cow. There are only four weeks in the year that you can pasture. How can you keep an animal four weeks on good pasture and eleven months afterwards? What in the world is the use to run an animal out eight or nine miles a day to get enough grass to eat to make a little milk. You cannot afford to handle cattle.

A Member: Doctor, I am not in debt and I made a great deal of money off grass pasture.

DR. DETRICH: Yes, that is right, but what became of the other part of the farm.

A Member: We are farming that.

DR. DETRICH: How much do you get off an acre. You take your silos today and with the opportunities which we have of putting oats and peas, grain, rye, corn, getting two and three crops a season on the farm and you can see we cannot afford to pasture.

A Member: What is the use for pasture land that we cannot plow?

DR. DETRICH: Give to cows, put on hogs, raise sheep; but don't try to make money pasturing cows.

A Member: You will admit that sheep will do all right?

DR. DETRICH: Yes sir; so will steers and young cattle. I am talking about the cow; but I tell you plainly that it cannot be done profitably and I have seen it tried and it is the same old story with the best of pasture, whether fall grass or anything else. Use your land for hay and grow young cattle.

A Member: What do you feed the cow?

DR. DETRICH: Feed the best stuff and give the best water.

A Member: Do you feed green grass:

DR. DETRICH: Lots of it; everything that will bring them right up to the notch every day; feed them well.

A Member: When do you cut these oats and peas for hay?

DR. DETRICH: I will guarantee you that when you can just see the eye of the pea in the pod, paying no attention to the oats or rest of the peas in bloom, cut. If you don't cut when you see that eye or button you cannot cure your hay. If you allow it to grow up to the size of the cooking pea you cannot cure your hay. You can see it by looking at the pea, a little swelling.

A Member: For how long a period did you use that crop as a siloing crop?

DR. DETRICH: Since the silo first came into existence. Be sure and cut it one-fourth inch long. There is no trouble in feeding the next morning after cutting. If you cut it one-fourth inch you can get more of that length into the silo than any other cut length. If you want to feed tomorrow, go into the silo and scrape off the top and take out enough for one feed. Then tramp it hard. Then at noon if you want more tramp for four or five minutes and in the evening do the same thing and you will not have a bit spoil.

A Member: If you wanted to do that with silage you will take the same plan?

DR. DETRICH: Certainly; if you finish cutting corn on Tuesday evening and you wanted to feed Wednesday morning you could go in and take off one layer of feed, just enough for a feed, make it perfectly level and tramp for five minutes. And then take off enough at noon and in the evening, tramping it each time, and you will not have any trouble. You are getting the air out of it and giving no opportunity to start to spoil.

A Member: You have talked a good deal about the seed bed for grass seed. How long should this seed bed be in the course of preparation, getting this mulch, etc.?

DR. DETRICH: I like two years, starting with the corn field, to see what we are going to do in the years to come.

PROF. WATTS: You spoke of the grass growing between the rows. Don't you use a jointer?

DR. DETRICH: I am not talking about the proper kind of plow.

PROF. WATTS: We have seeded after the Clark method and that is practically the Clark method.

DR. DETRICH: In Clark's method he harrows the piece of ground thirty-three times. I would not fool my time away like that.

PROF. WATTS: But we must all harrow in order to keep down the weeds and get sufficient mulch on the soil before we seed and then we run the danger of washing in case of heavy rains.

DR. DETRICH: Never roll a field after it is seeded. There is entirely too much rolling on the field, the people use the roller too much. I have seen many fields wash that were seeded to nurse crops. There is nothing that will prevent washing. The surface draining must be attended to.

A Member: What do you do with this rye?

DR. DETRICH: Feed to the cattle.

MR. GOODERHAM: You simply sow the Canada field peas and oats after you take the rye in?

DR. DETRICH: No, this is in the spring of the year. I never let the field bare; have something growing summer and winter, and put the rye on as a nitrogen holder in the winter.

A Member: How late can you sow your peas in Chester county?

DR. DETRICH: We try to get them in as early as possible.

A Member: How early?

DR. DETRICH: In March if we can.

A Member: When you can't do that?

DR. DETRICH: In April if you can. I did that and got good peas and oats.

A Member: Do you always follow your corn crop with oats and peas?

DR. DETRICH: Generally with rye.

A Member: I mean after you take the rye off?

DR. DETRICH: When I want to seed it to grass.

A Member: How tall do you let this garlic get before mowing?

DR. DETRICH: You set your machine so that you can cut it off two and a half inches high.

A Member: Is your first cutting of the hay crop as heavy as the second the second year?

DR. DETRICH: Oh, yes; the timothy is tremendous. We top dress after the first season is ended. I don't believe in putting manure on once in five years.

MR. BARTLEY: What would you do with the man who did not have the manure to put on?

DR. DETRICH: I would give him a position out here at this mill. Keep animals around the place.

A Member: Your advice to the farmer is just to manure this field before plowing?

DR. DETRICH: Certainly. I never want to plow up a field when I have no manure for it. You are exposing your soil.

A Member: How many bushels of peas do you plant to the acre?

DR. DETRICH: About 54 quarts of peas and 54 quarts of oats; and you can sow the peas first and then the oats afterwards. Some sow them together; but the oats are better for being only one inch deep, while the peas are better if three to four inches deep.

A Member: For what reason do you plant the peas deep?

DR. DETRICH: It is the pea's nature; they dry out and burn and get yellow if planted shallow. If down in the ground they keep green longer.

A Member: Suppose you sowed oats and peas the 1st of April, about what time would you harvest for the silo?

DR. DETRICH: I would let them ripen for the silo. I want them just a little bit harder than for table use, but not hard enough for seed. Just so they don't shatter; about eight weeks is the time it takes.

The CHAIRMAN: Owing to the absence of Mr. Foust, this closes our program, unless some one has some other matter they wish to bring up.

I want to make the announcement that the photographer is here and any person wishing a photograph can secure same by giving your name. The studio is at 215 S. Main street, Butler, Pa.

DEPUTY SECRETARY MARTIN: Mr. Chairman, before you adjourn I desire to say a word. You will notice that during the sessions of this Institute I have said but little. There has been no necessity for my talking very much. I feel that the Institute has been supplied with instructors along the various lines amply able to take care of that. There is another reason why I have been very quiet; that is, in coming down to this meeting I contracted a cold, as you will notice, and cannot well speak.

I may say to you that this meeting has given me a renewed inspiration in the great work of developing farm operations in Pennsylvania. The manner in which the County Chairman and the Lecturers, and the visiting lecturers, and the people here in Butler and in Butler county have sustained this meeting, it could not be otherwise. At the close of this, the last session of the Institute, your continuous struggle with the subjects presented and the questions you asked indicate that we could, if necessary, hold a ten-days meeting and then only get on the outskirts of the great principles of agriculture, and hence I feel that those who attend these meetings, the lecturers and county chairmen, you will go home and work with renewed vigor and with a higher degree of intelligence and more determined desire to make the Institutes of the coming season the best we have ever had in Pennsylvania. *(Applause.)*

The CHAIRMAN: If there are no further remarks or business, this Institute will stand adjourned.

A. L. MARTIN,
Director of Institutes.